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# 2D Game Art



**A simple guide to creating great 2D game art & animation.**

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# 1

## Introduction

As artists we are always drawing, inventing new worlds for our characters to live in, or seeing the world around us as food for our pencils. So to that end I was drawing for as long as I can remember. My first break into the professional world of animation was with Sullivan Bluth Studios Dublin, Ireland. Here I was introduced into a world where artists worked hand in hand to create very complex and involved classical animated features.

Each drawing was created frame by frame and reworked to perfection for structure and timing, till a handful of drawings became a scene. Passed from department to department till each scene made its way in color to film. So all our works were transformed to acetate and eventually pixels, for millions of people over the world to see.

A studio has a life and attitude that is fueled by the Director, Producer and Department heads. Their way of working and ideals are carried into the life blood of each artist, integrating seamlessly as a process, driven by the skills and talents of people with abilities in production, efx, character,

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color, scene planning and storyboarding etc

I worked with many people from each of the disciplines within the animation world, who inspired and educated me. I was shown how the creative process works, from story to final. I saw how the vast machine that is the production process was managed and tracked, creating the balance of artist and economics.

Over the course of my work in animation I worked on eight features, TV adverts, Games, and some straight to video movies. I had the great pleasure to work with some of the big names in entertainment, Sullivan Bluth Studios, 20th Century Fox, Viacom and Disney but to name a few.

I learned many ways to produce art and the process that it takes to create something unique and with quality. I brought this to my web work as an Art Director, which was a stepping stone to the world I work within now, gaming. It is my goal in this document to write and illustrate how art can be created for 2D games.

Currently I create art both 2D and 3D for sale in the Unity Asset Store, under Atomic Vertex, I also freelance out my skills to games companies around the

world. So please feel free to check out unity 3d and browse my work. I will be using samples in this book on currently selling assets, to demonstrate the techniques I use for game ready assets. I hope this book will benefit professionals and novices alike, and that you find what you are looking for within these pages.

Regards

Declan

AtomicVertex.com





# 2

## Game View

Picking an angle that your game will play at is crucial. Its possibly the only decision in 2d you will make that will effect your whole project. Most decisions can be revised and reworked, however once you pick the view that the player will interact with your game at, and you start to create artwork you are locked in. It becomes timely and in most instances very costly to revise. I would always encourage you to research other games and find a view that you like and try to create to that angle. In this chapter I will go over the different views and show you how to find an angle from a piece of artwork. Help you to create a template to work from and how to use it in your work, and give some tips on creating hand drawn art for your projects.

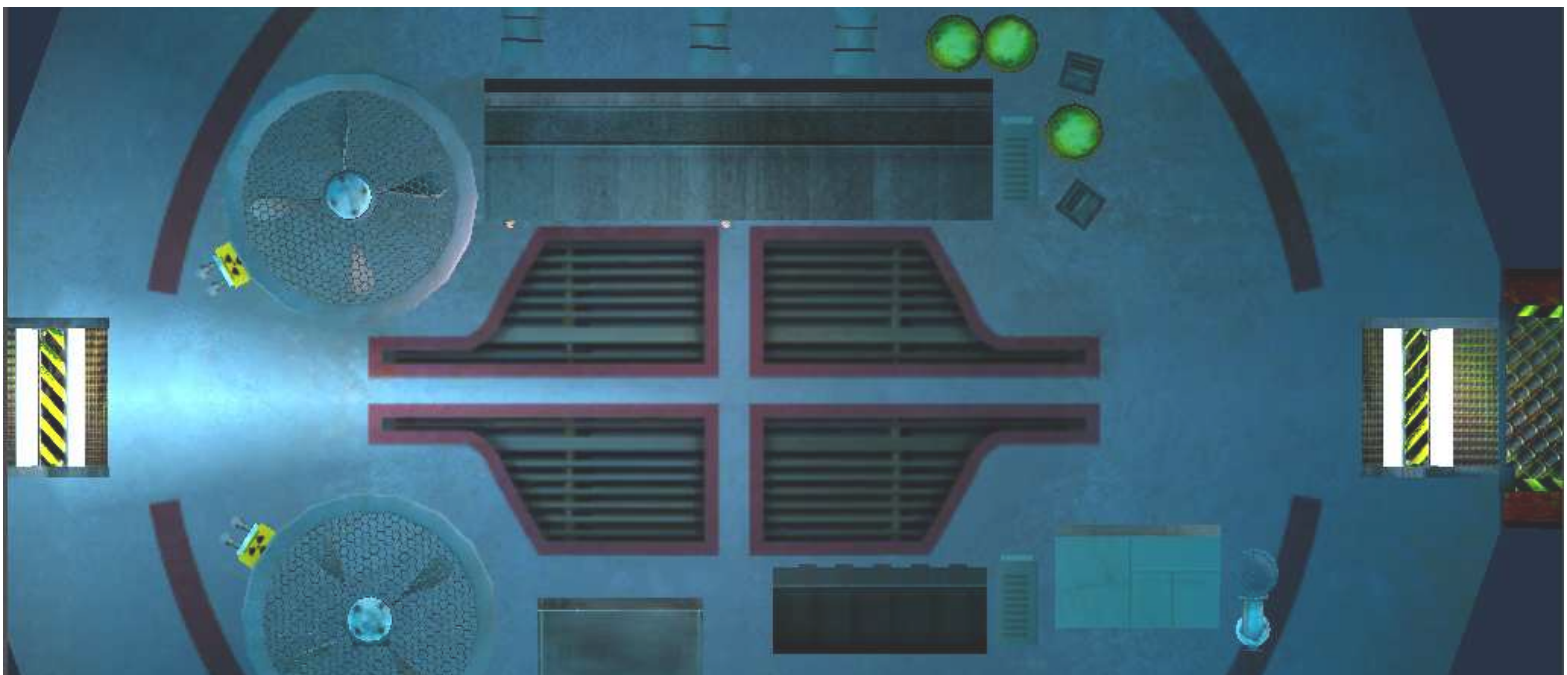
Top down, Side view's and isometric. Top down and side views are by far the simplest ways to create a 2d game. Thats not belittling the skill that goes into creating these views. Its the same principle skill set. In a top down view we are looking through the camera from above the character. Side view is aligned with your eye as you would look at an object straight on, the horizon for instance. What if you want a bit more from your game? What if you want to make

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it feel more immersive? Isometric, is the tilting of the view from top down or side, to reveal more of the play area. Giving the game more of a 3d feel, and allowing us to build out the world.

Orthographic is a word that you will hear me talk about later so just to cover the topic quickly here. When I talk about orthographic its a way of showing a 3d drawing in 2d space. The term orthographic projection is a way of drawing that depicts images that have no perspective and are parallel. This is important, in that the reference lines will be parallel and never converge. The asset will be a 2d drawing but shown on a flat parallel plane giving it a sense of depth.

### ***Top Down***



### ***Side View***



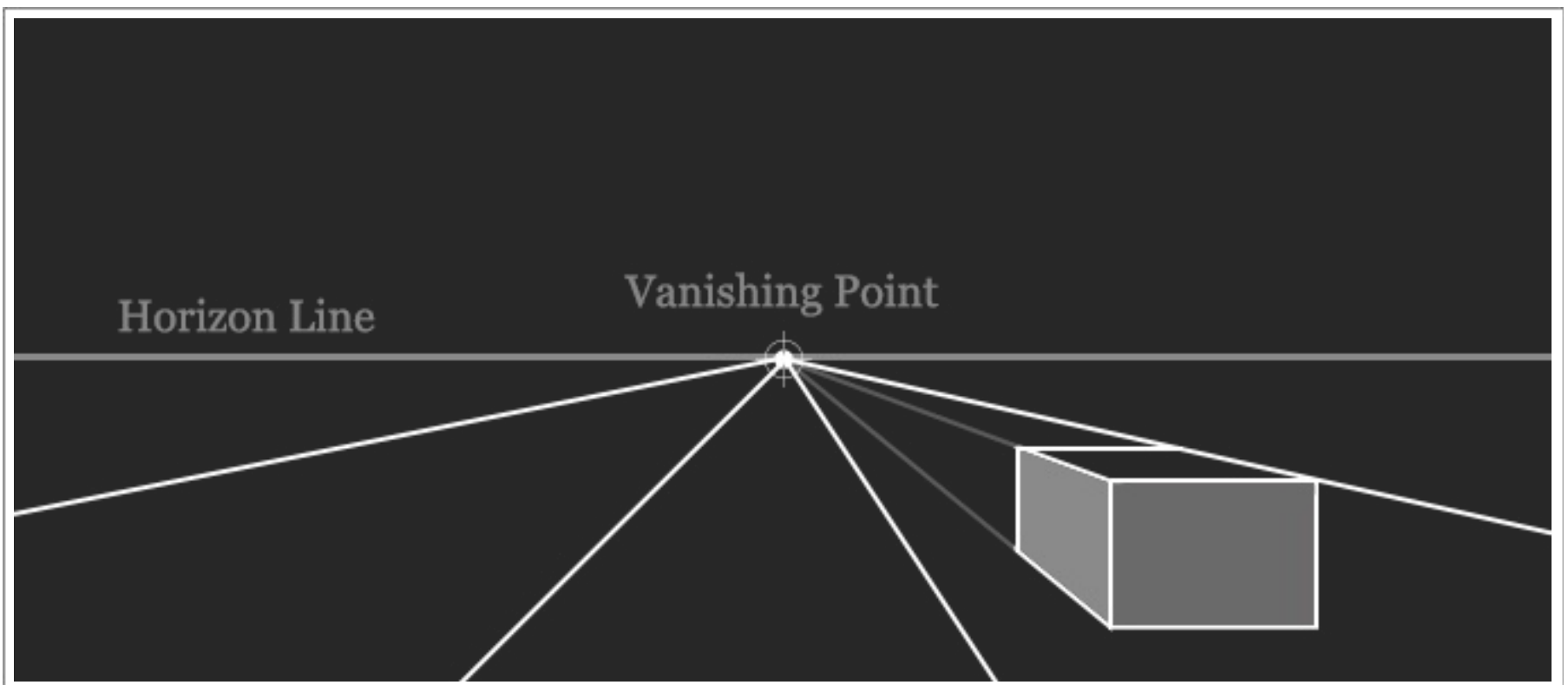




## ***Isometric***

In this book I will be focusing on the Isometric view. However you will see that its also very simple to change out the angles to find what suites your needs. The first thing to note is that drawing in an isometric view will eliminate the vanishing point.

So typically in a perspective view, we would have a horizon line, and a point on that line that all line's will converge at. You may have multiple vanishing points, the sample below is a single vanishing point. I will go over drawing in perspective at the end of this chapter.

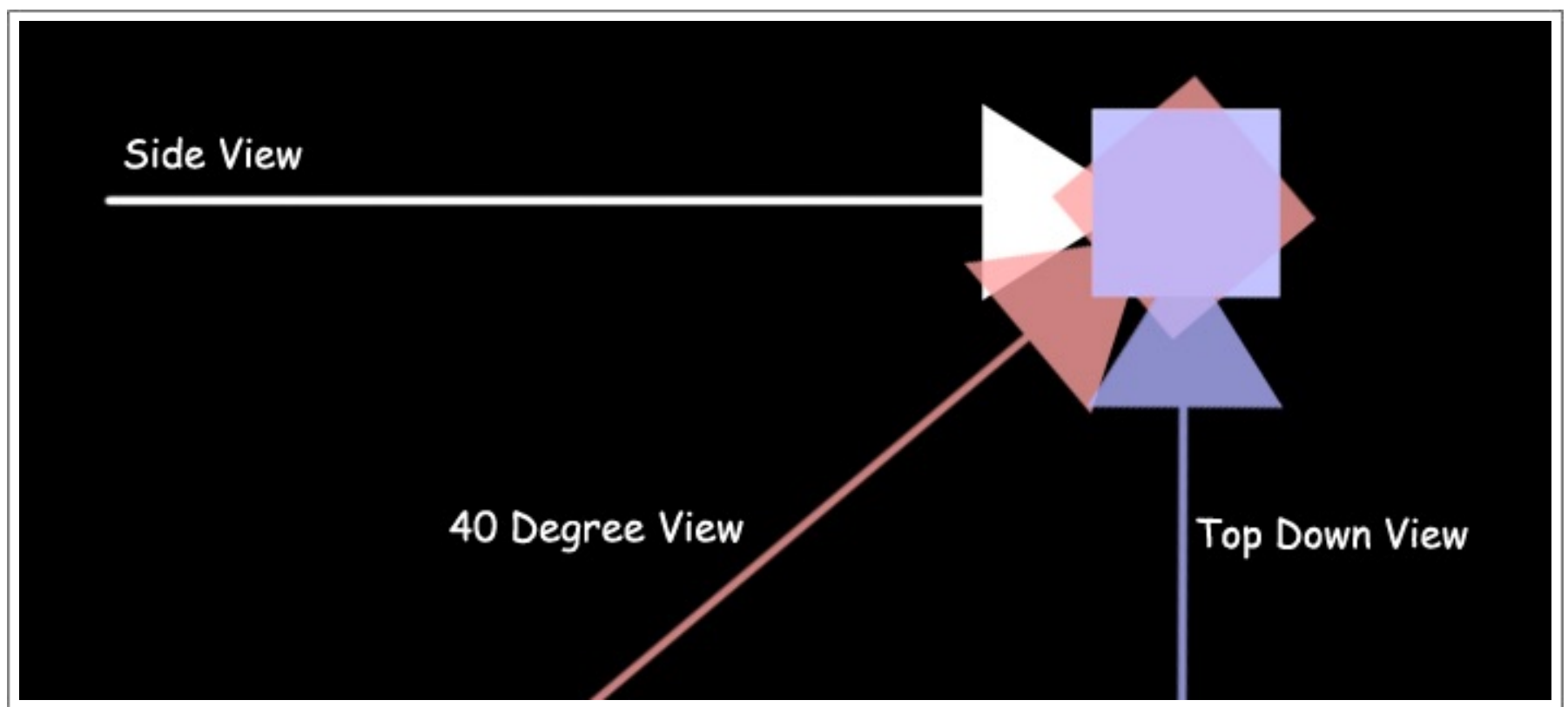


## ***Perspective***



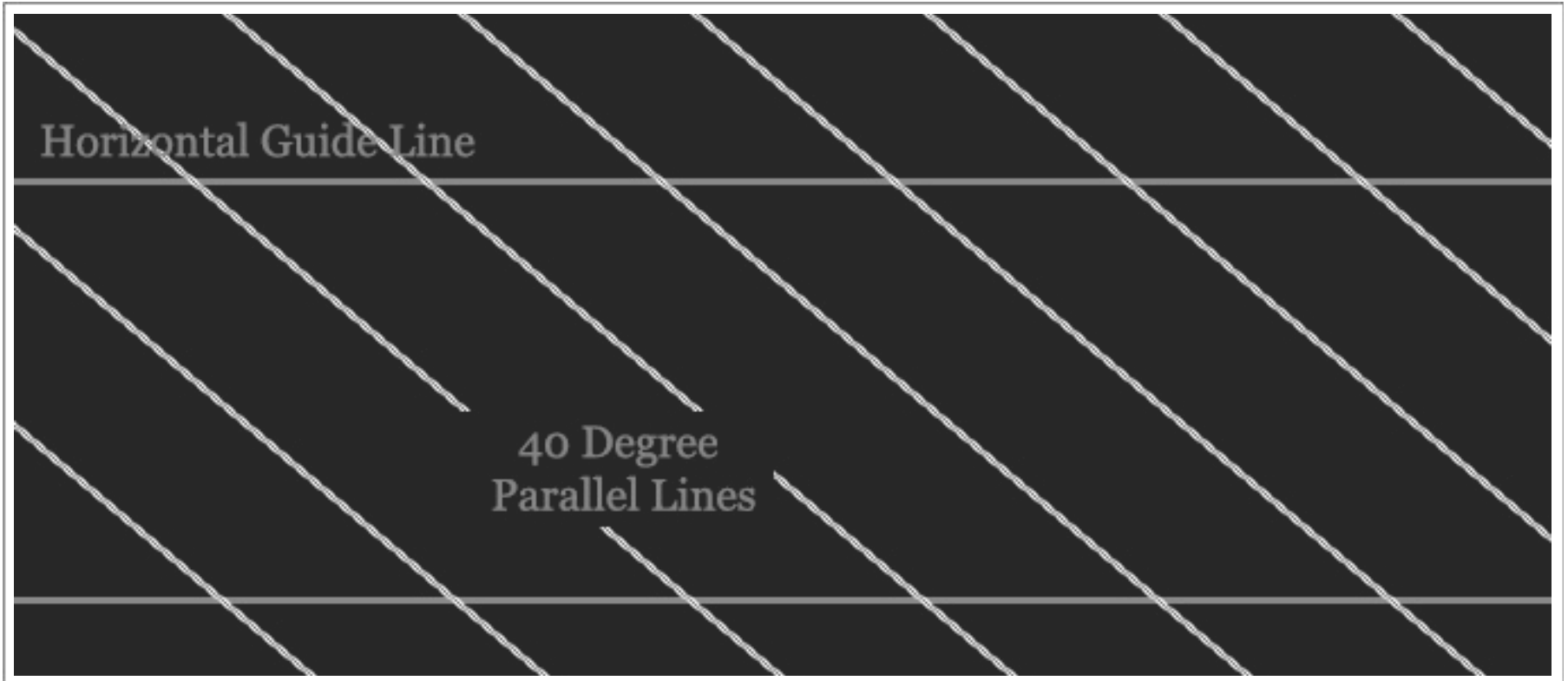
How do you know what angle to pick?

Imagine looking through a camera on a tripod lining it up with the horizon. This would be your side on game. Now start to tilt the camera down, till you are looking at the ground from the top down. These would be your side and top game views without the sense of depth. The views in between straight on and top down can also be used for your game play, remember these views will not have perspective.



The reason for this, if the lines converged the player would be out of space, also they would have to look like they were going off into the distance. So with the lines parallel seeing the game through a camera view, the environment will always look correct and not skewed in any way. *Note: A game level looked at without the camera view will look odd to the eye, but close up it works great.*

With our isometric view we will have a set of parallel lines that will never converge, this is called an orthographic projection. The aim is to make the player feel like they can walk through a more dimensional environment, without using a fully immersive 3d environment.



### ***40 Degree Isometric View***

So what angle do we choose? This decision is up to you, and your vision of your game. I find that working between 35 and 45 degrees yields the best results. However, you may have seen a game that you like the angle of and want to use that. So let's go about finding an angle of an image.

Create a screen grab or find one on the web that you are after. On a Mac Shift + Cmd + 4 and click and drag will create a screenshot for you. On a PC you can use the snipping tool in accessories.

Bring your image into Photoshop and create a layer on top. Select the Line tool (U) and hold shift while you drag a horizontal line across your image on the new layer you created. Open the info tab if it's not already open. Transform the line PC Ctrl + T, Mac Cmd + T. Find a section of the background that has straight lines, a good example would be tiles on the floor, edges of planks or bridges etc. Rotate the line till it lines up as accurately as you can manage, in the info panel you will notice that it gives you the degrees as you rotate. I would recommend that you do this with a few different lines and try to get a common number. That number will be the angle that you will create your template to, and create your art from. See next page for step by step instructions.

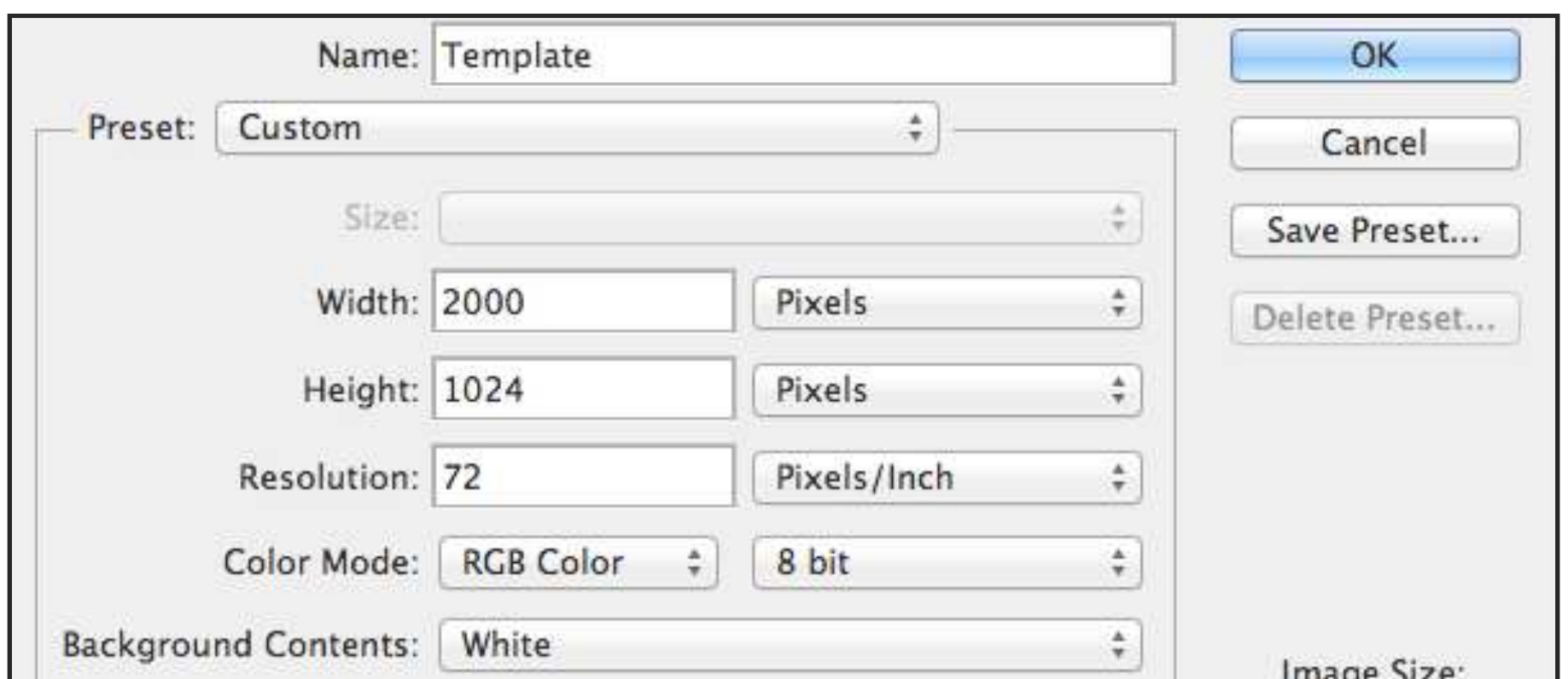


### *Fully painted game level at 40 degree view*

I always use 40 degrees as it gives the best view and is easy to work with. We now need to create our template to work from so all our artwork remains at this angle. The process is very similar to finding the angle of a piece of game art.

First open your graphics application of choice. I use Photoshop, so will use that to demonstrate. The process and result are the same no matter the software you use.

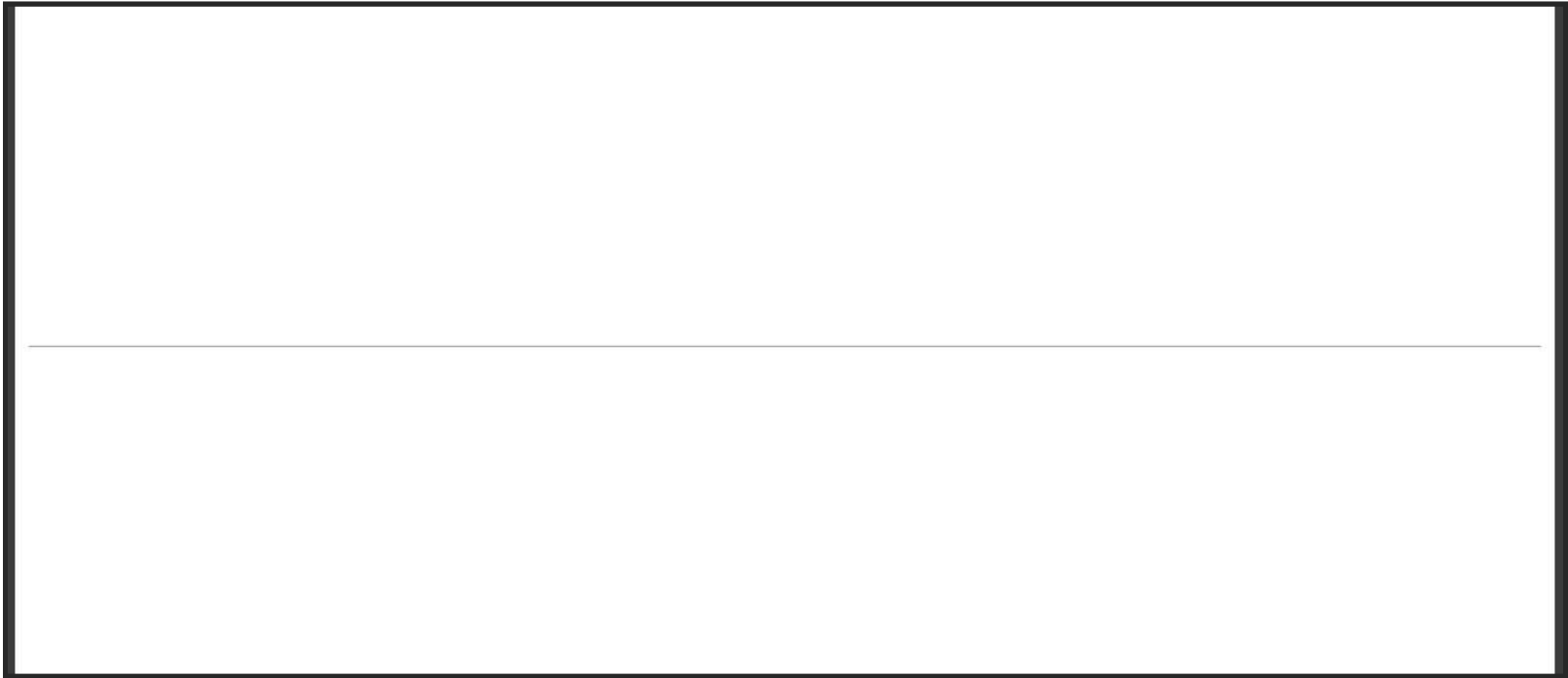
1. Create a new document. I always create a much larger document than I need for game



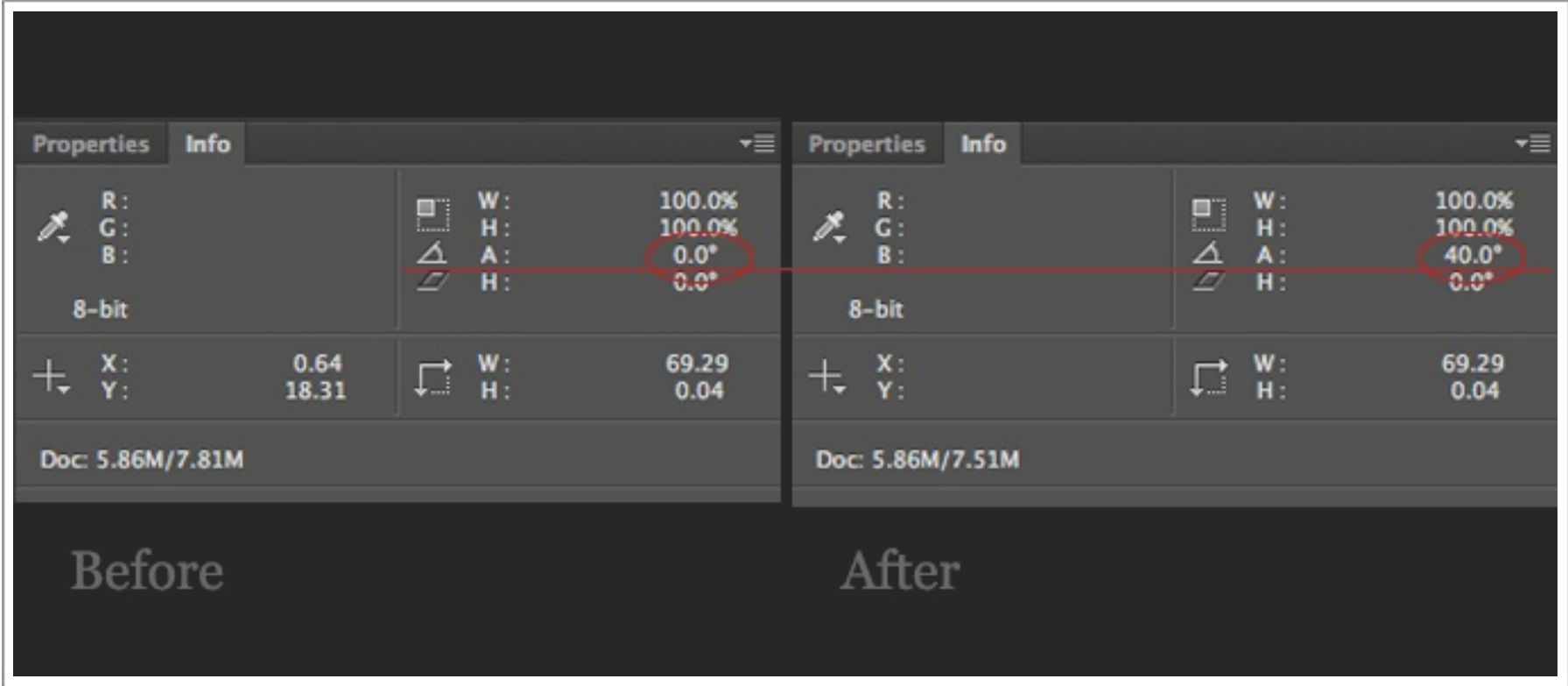


play. As I will create my images larger and resize later, but I will always resize down, as this gives the best results. Always avoid resizing up as you will loose quality.

- 2. Create a new layer
- 3. Using the line tool, draw a horizontal line (*hold Shift while dragging*) in black.



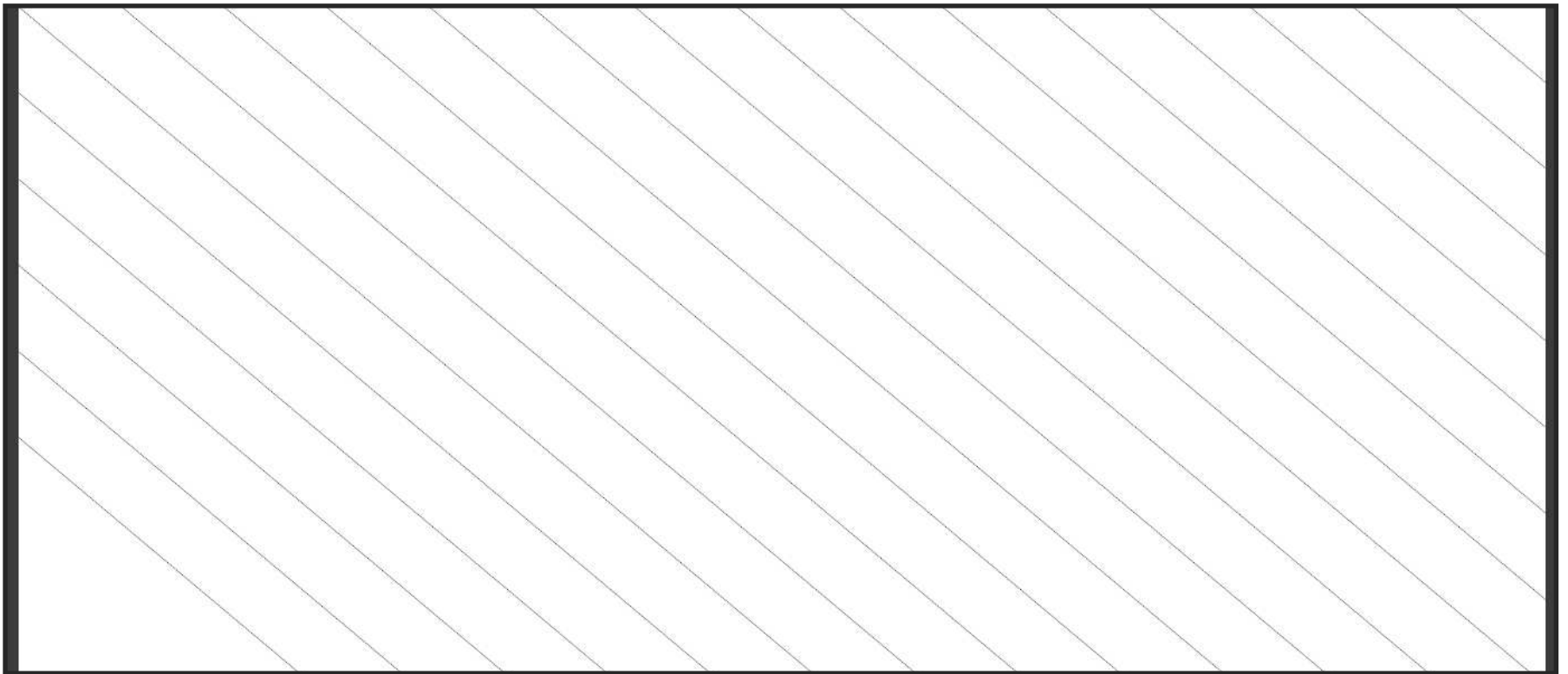
- 4. Open the info tab and using the transform tool (*cmd+T*) rotate the line till it reaches a



40 degree angle. Press enter to commit the change.

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5. The result should be a line at a 40 degree angle on your page. Copy this line across your page, as in the example below, making the spacing even with the align tools.

This will be our template. With this we will create all our 2d art, drawing to the lines that we have laid out. So make sure you save a copy and file it somewhere for easy reference. I always lock the layer so I cant draw on it by mistake.



### ***Template***

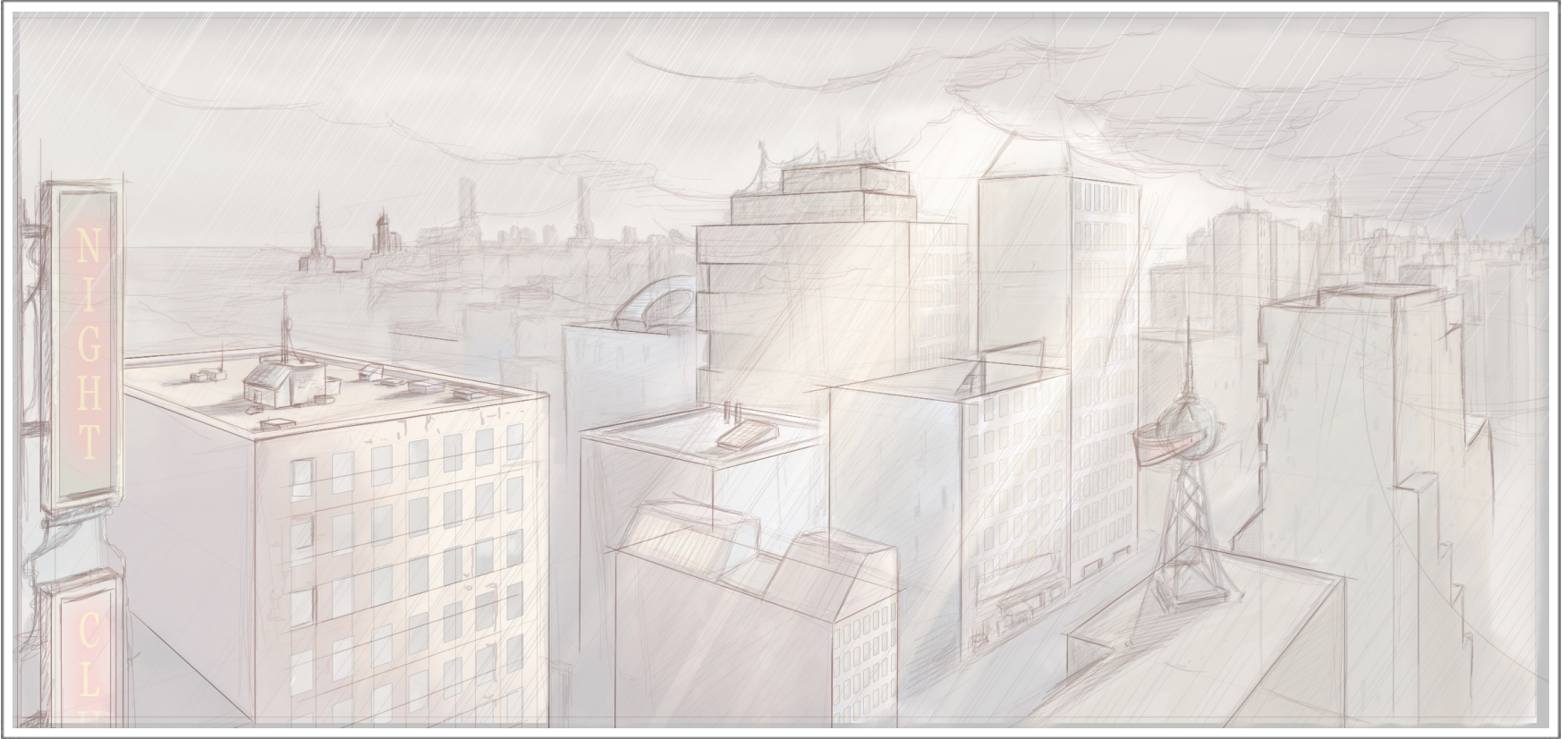
In the next chapter I will show you how to draw to this template and how it will keep all your artwork consistent.

Lets go over some basic perspective, the reason is simple, sometimes you will want to conceptualize an area or asset without the confines of the parallel lines or explore an environment in a way that helps you see it in a different light.

### ***Basic Perspective***

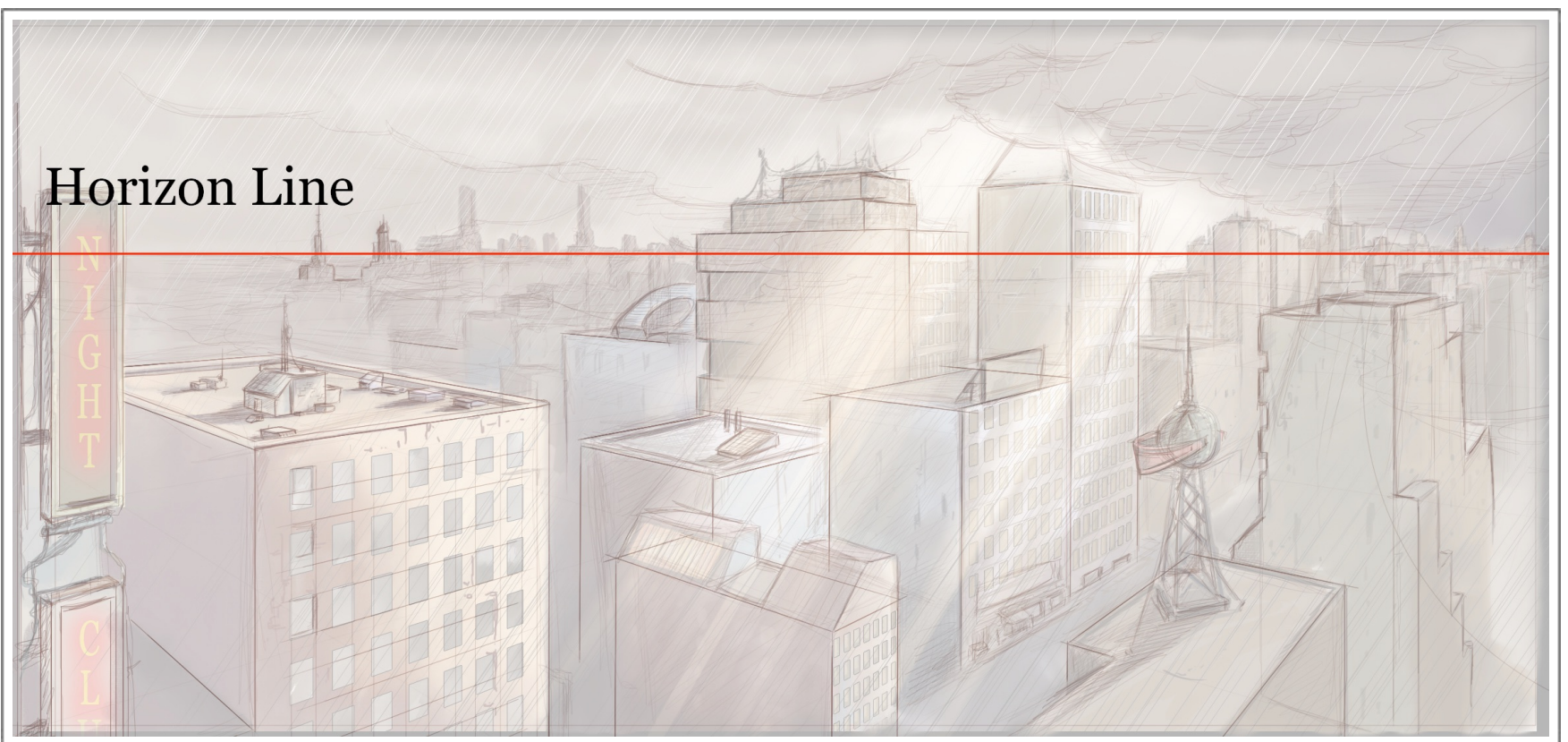
#### Picture Plane (PP)

If you were standing in an apartment looking out the window at the city outside, the window could be considered your picture plane. Its an imaginary plane that stands between your view and the object you are viewing. For instance if you drew the city on the window by tracing the lines you get an accurate drawing of the city in perspective.



## Horizon Line (HL)

Horizon line is the line that is level with your view, or eye level. Imagine looking out your window. The line where the City meets the sky is the horizon. Its a line that will cross



your drawing and around which the objects in you drawing will be constructed.



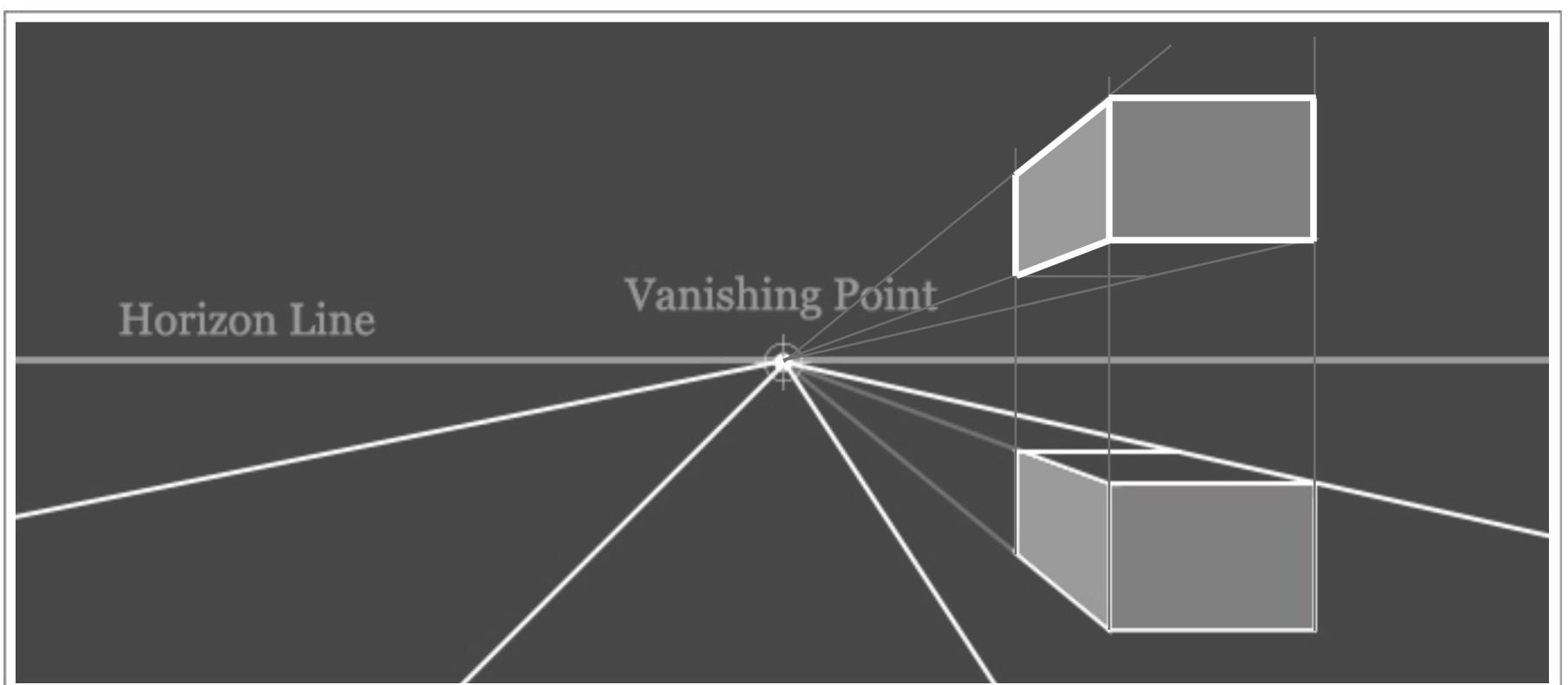
If a building was close beside you it would be full size, however as the building moves towards the horizon it will start to appear smaller. We can achieve this by using vanishing points.

### Vanishing Points (VP)

In a perspective drawing lines will recede away from your view to a point on the horizon. This point in space is called your vanishing point (VP). Each object in your drawing can either share a vanishing point or have their own vanishing point. For instance two buildings next to each other might share the same vanishing point but one across the street might not, because they are not parallel to each other.

When an object is below the horizon line, we will be able to see the top of the object. As if we were looking down on it. If it were above the horizon line we would be able to see under it, as if looking up at it.

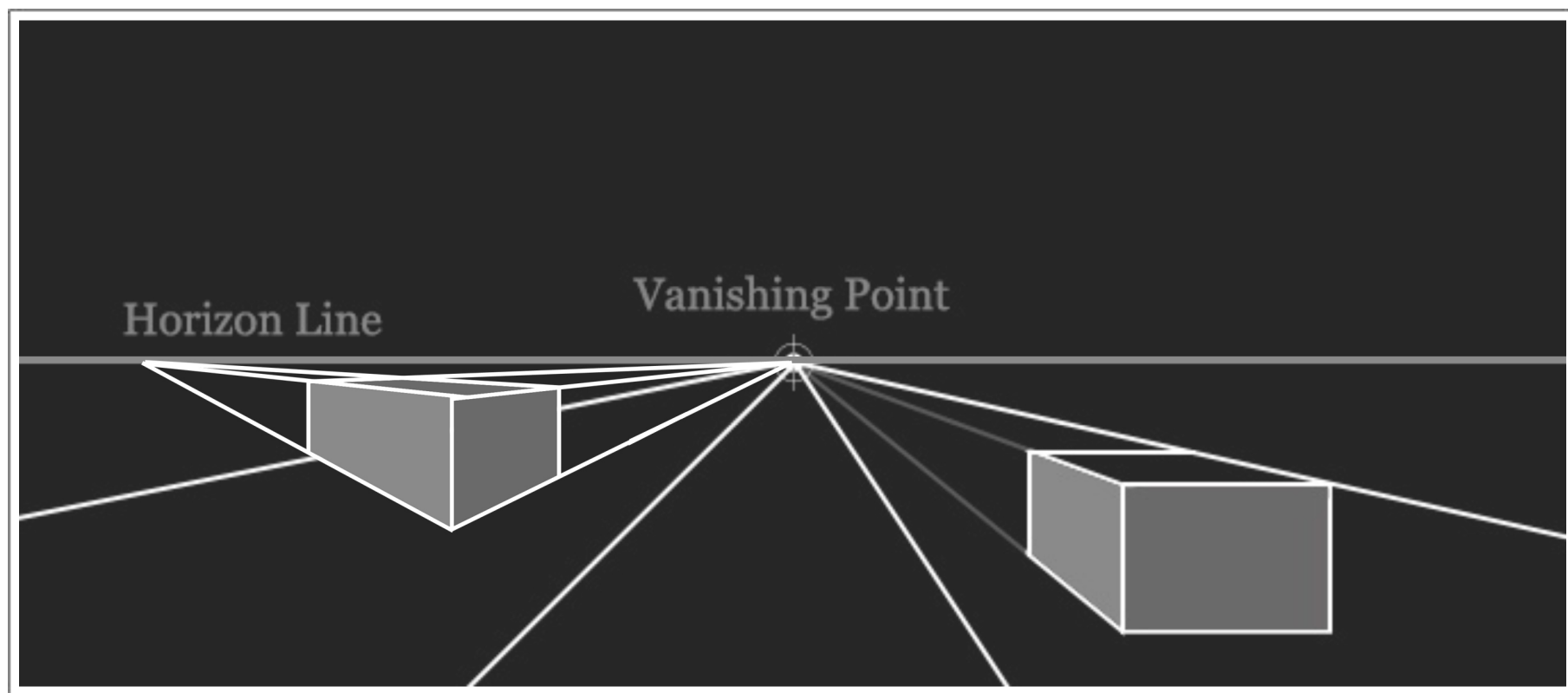
Lets start looking at how we can use our perspective angles to create objects. In one point perspective there is only one VP. In the example below you will notice that the box side has four lines that when drawn out will reach a point on the HL. Because the box is parallel to the PP the other lines will be horizontal to the HL.



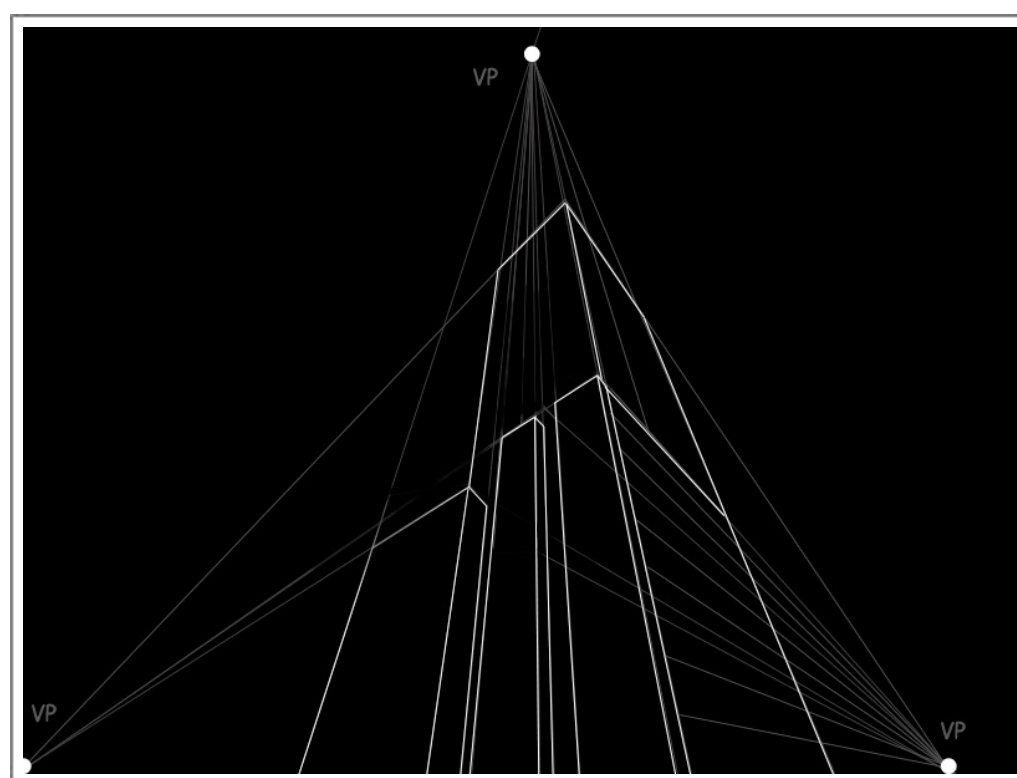
This does not always have to be the case though. We may want our box sitting at an angle to our view. In this case we can introduce another VP and use this to show our box at an angle to the PP. We can also be very accurate about the angle we create the box at. So if we

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place a line at 25 degrees to the horizon line (HL) and use that to find our VP's we can place the box more accurately in our drawing.

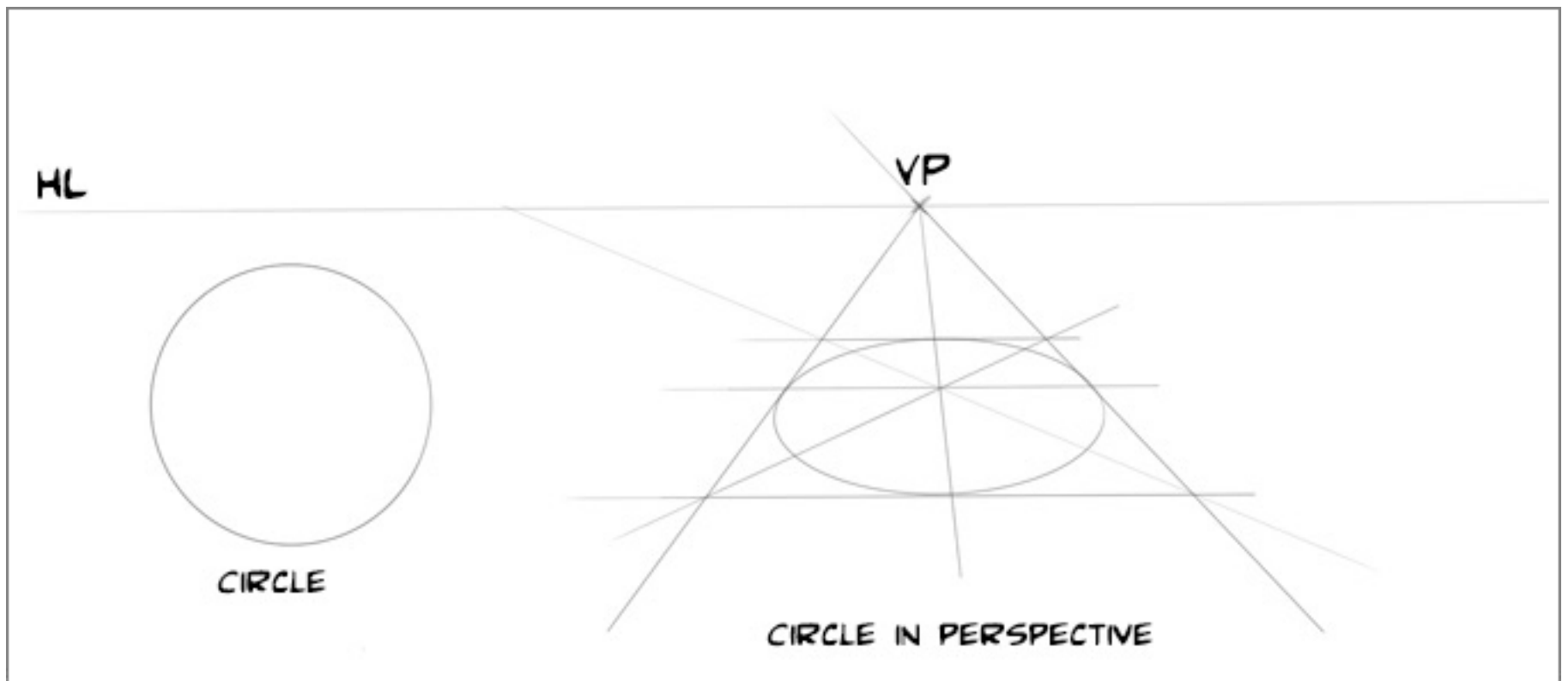


We can also introduce another VP to allow our vertical lines recede up or down. This is very useful if we want to create buildings like New York skyscrapers, etc.

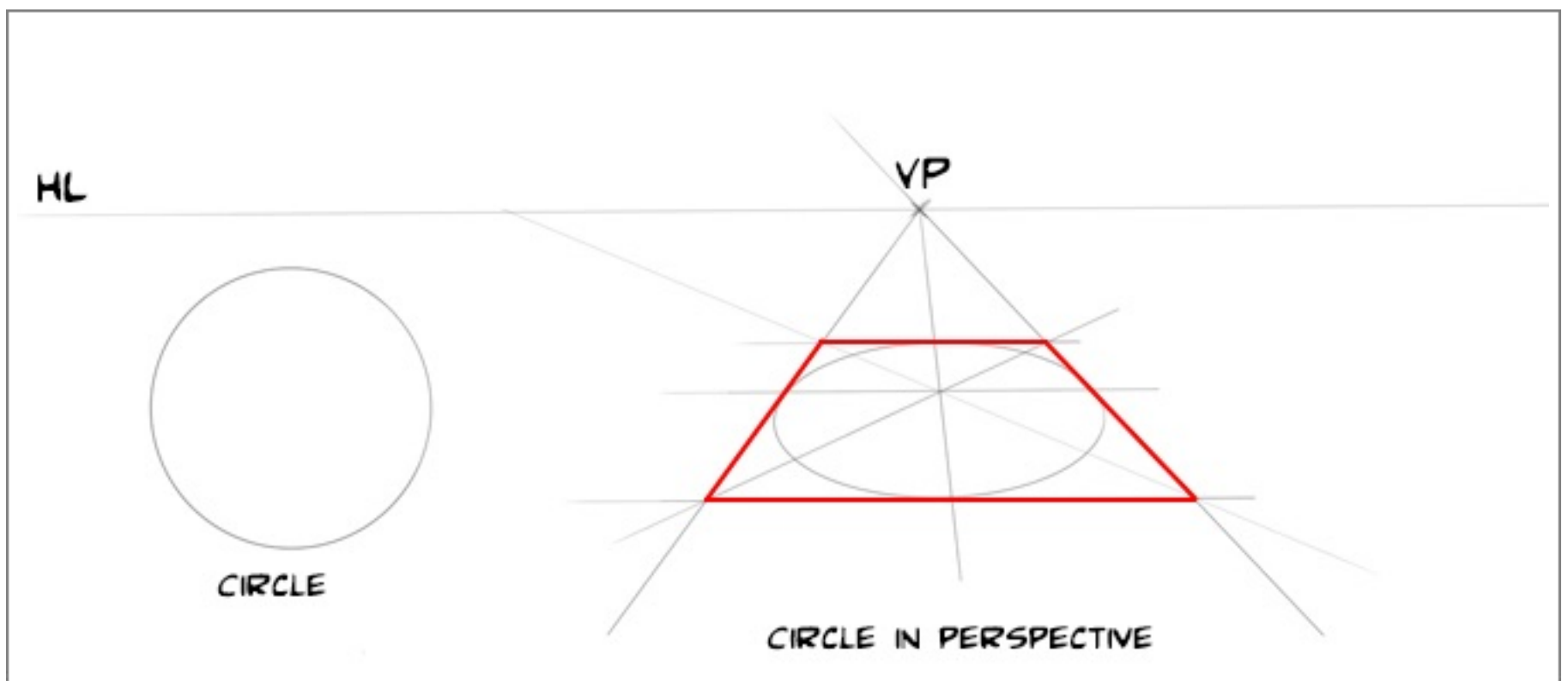


Laying a circle out in perspective can pose some problems. However I always like to break every asset down to its basic components and build on that. So to put a circle or half circle

into the scene, maybe its a table top or top of a barrel, etc. We must first consider where we want it to sit. Then if you consider a square is a circle with four sides, work with me

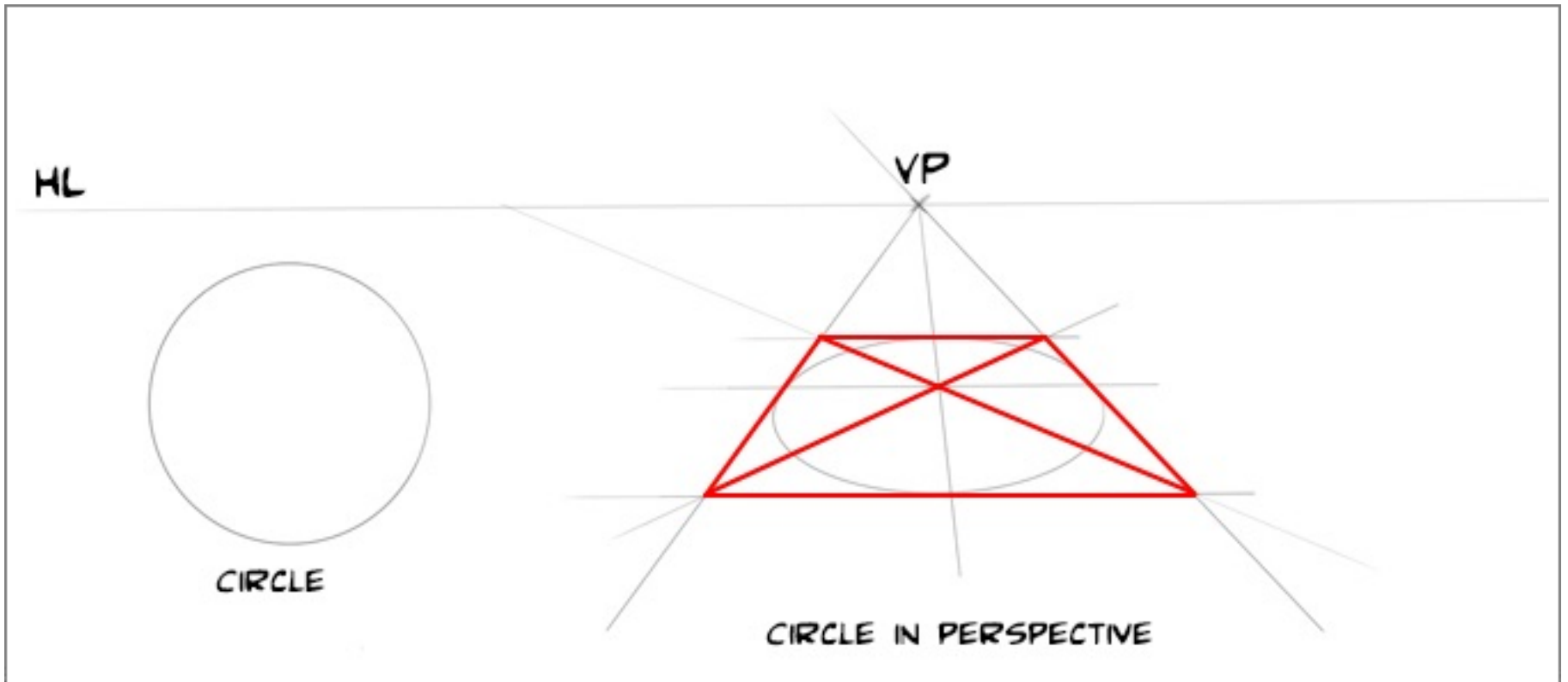


here. We know that we can use the lines of the square to recede to a vanishing point. Using this reference we can then draw our circle. Lets start by drawing out a square using our vanishing point.

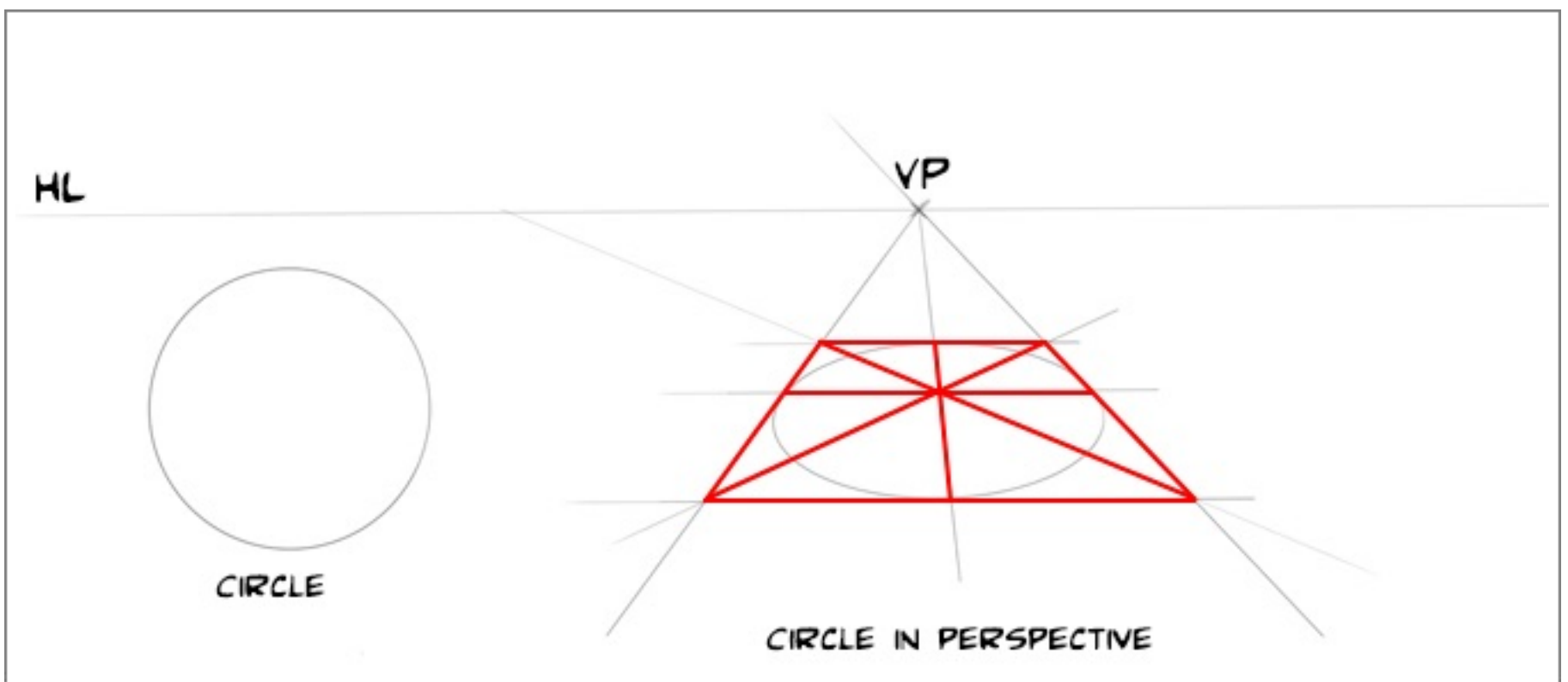


Then draw lines from corner to corner on our square. This will give us a centre point to our circle. For us to draw the circle as accurately as we can we need as many reference points as possible.

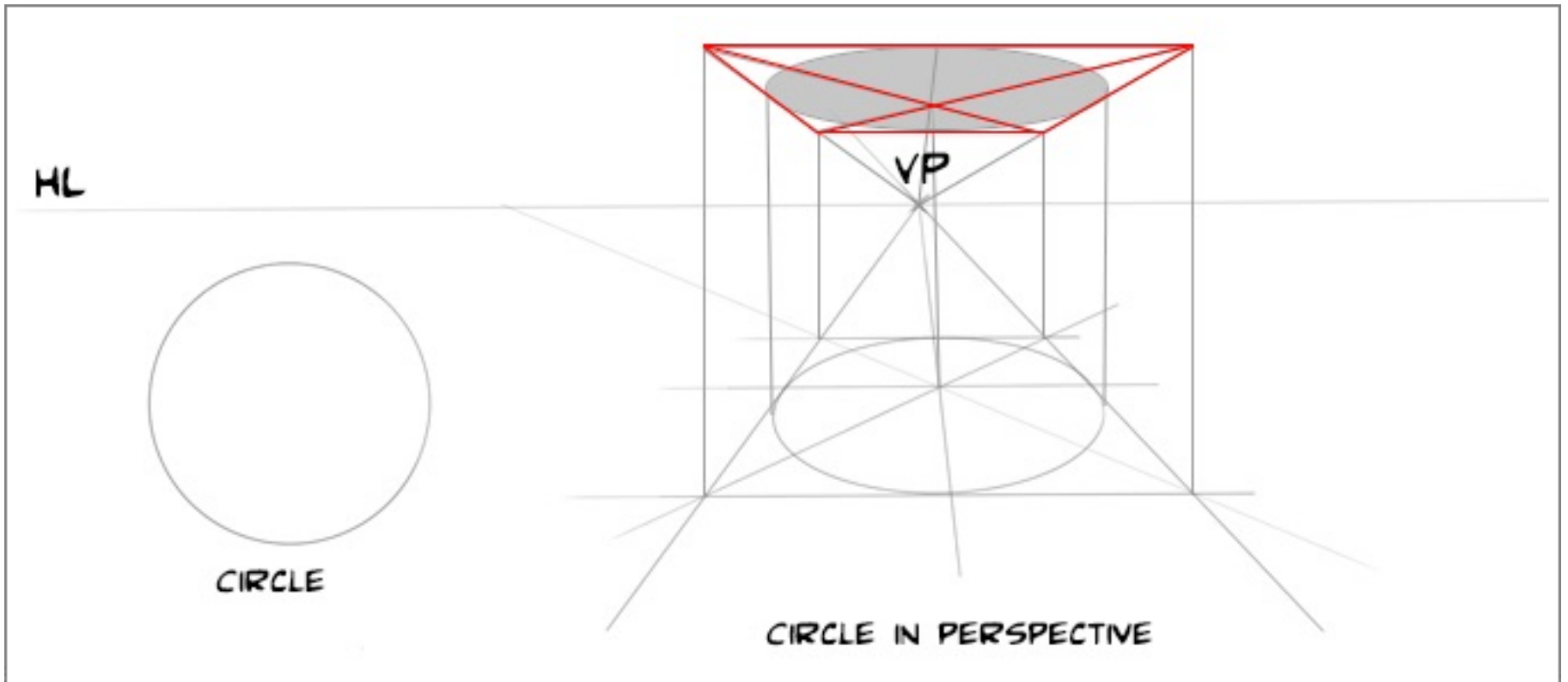




Using the vanishing point draw through the square where the lines cross and again where the lines cross draw a horizontal line. This breaks the circle into quarters. Through each of these quarters we can draw an arc that forms the circle. This may seem like a long way to get to a circle, however with practice it becomes very fast and will make your drawings look more professional.

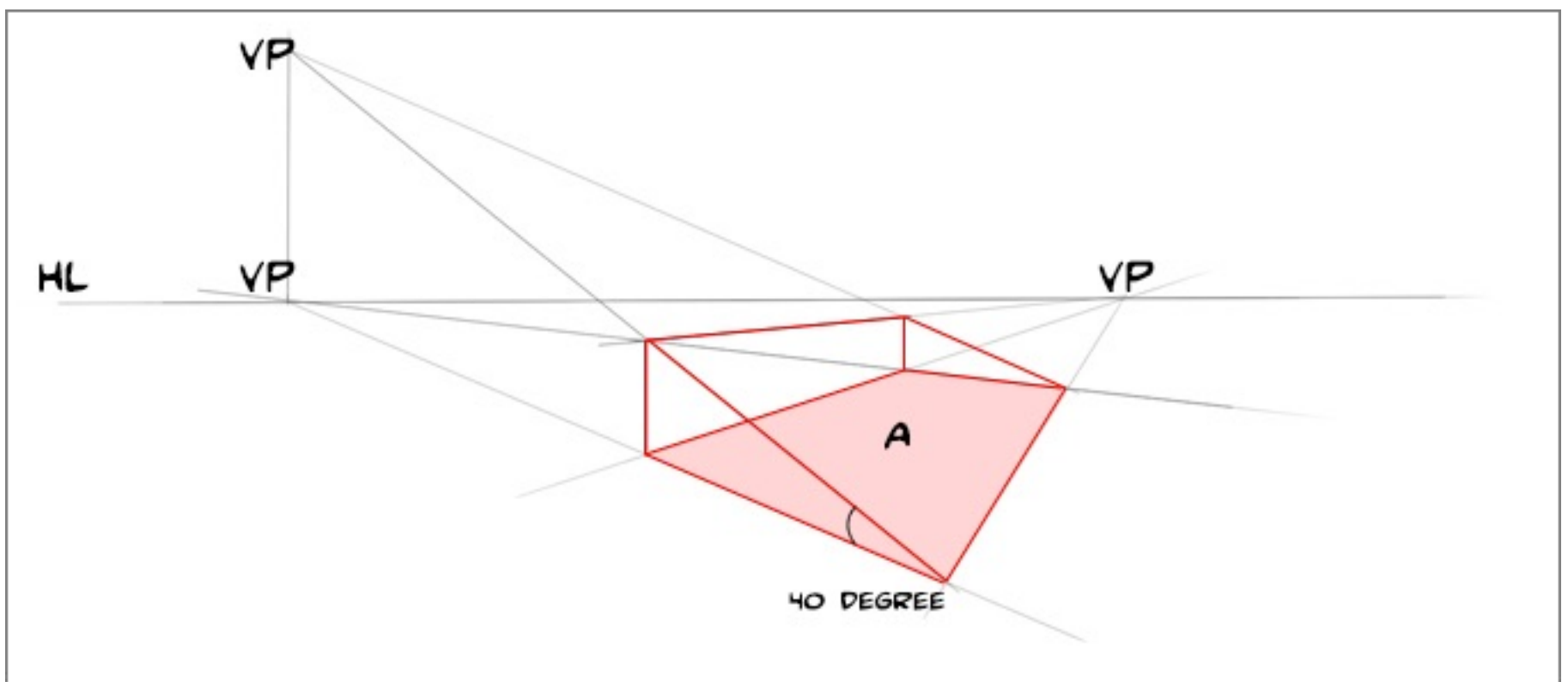


Using this method a circle can be drawn at any angle. By example, repeating the process above the horizon line and drawing the box lines straight up we can create a tube. This



gives us the ability to draw a table top a circular building and many other structures and at any angle to the picture plane that we choose.

Finally I would like to show you how to create a ramp or stairs in perspective. Lets draw a flat square. See image below this would be "A". To raise a ramp at the angle we choose. First draw a line vertical from one of the vanishing points. Pick an angle, I have mine at

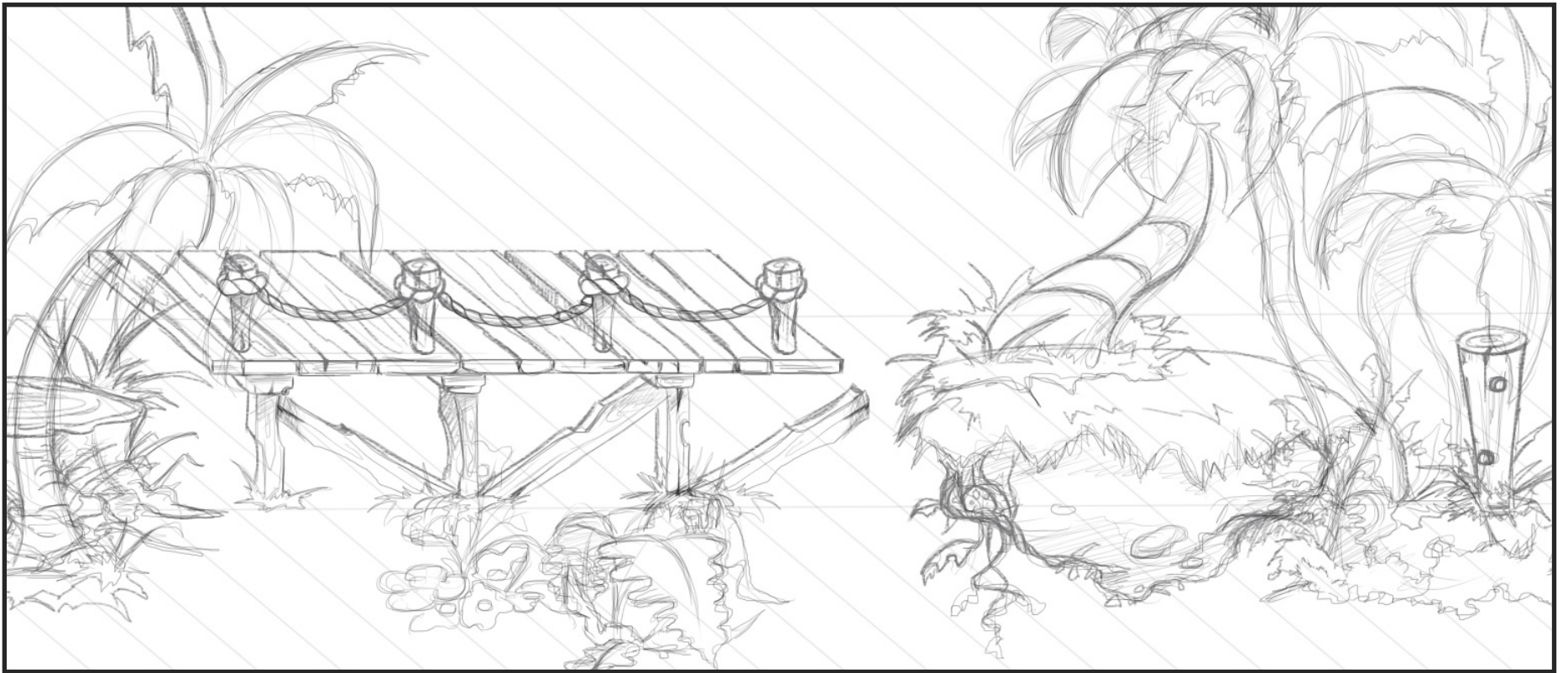


40 degrees and draw the line to the vertical, this will be your vertical vanishing point. Using this point draw a line for the furthest side of the square. We now have a ramp at 40 degrees in perspective.

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Using these simple perspective examples will enable you to get some very complex shapes or environments drawn. This gives you the tools to create concept art for environments props, and all sorts of game assets including character poses. Most important it will help you visualize your game and give you the flexibility to create cover art and explore the possibilities of a game level so that when you begin to create the assets your knowledge of what you are creating is much more rounded.





# 3

## Drawing Assets

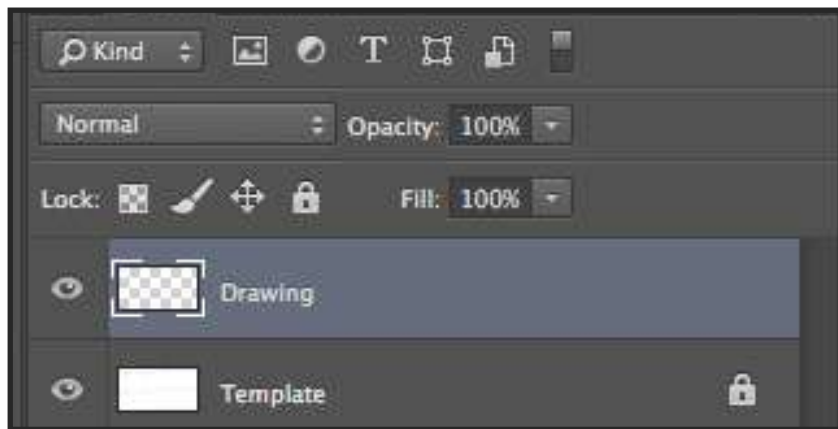
This section is probably why you wanted to read this book, so if you have skipped the template creation I urge you to go back.

The first thing to know about 2d games, we tile a lot! This won't be a huge problem in the drawing, but will need to be considered in the painting of your asset.

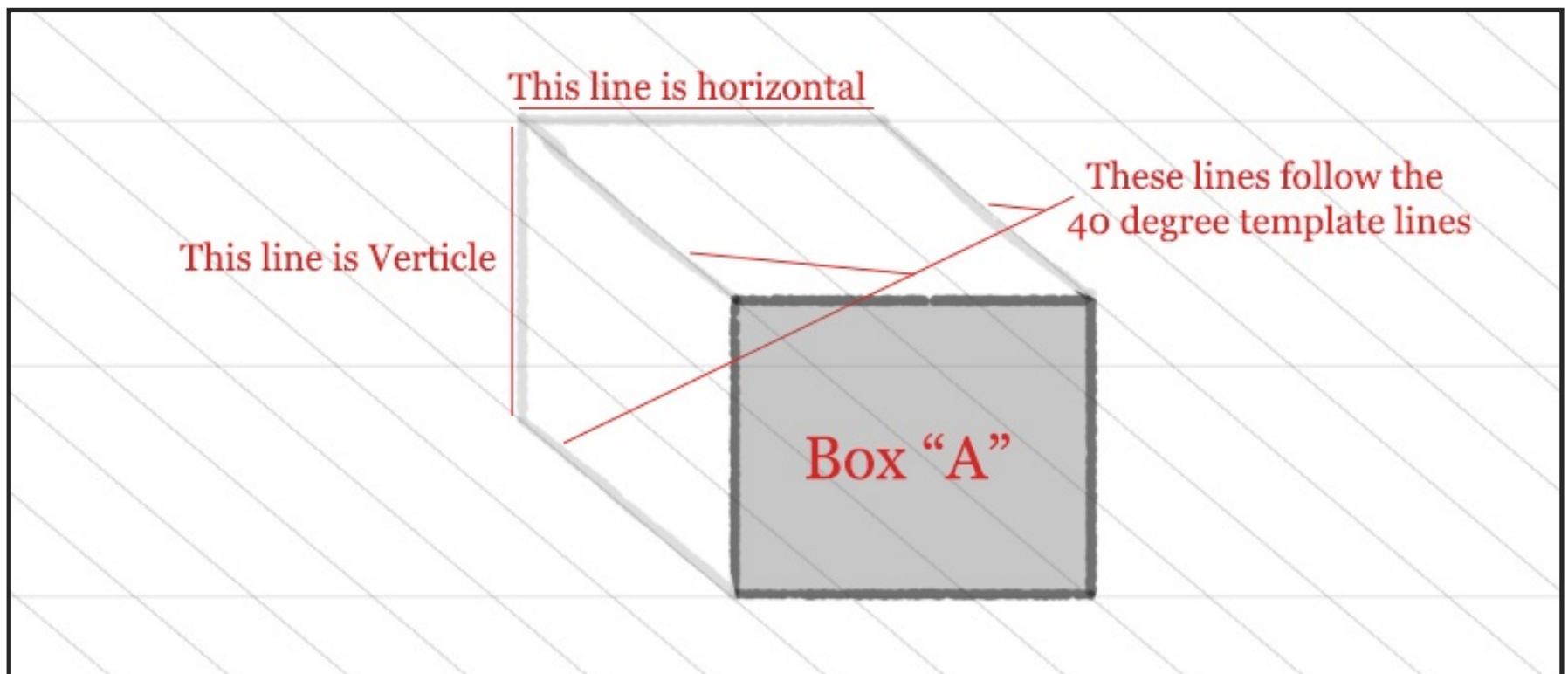
So let's start with something simple, like a box and build on that to create more interesting objects.

Open your template and make sure all your layers are merged into one layer with your template info on it. Lock this layer so you cannot work on it.

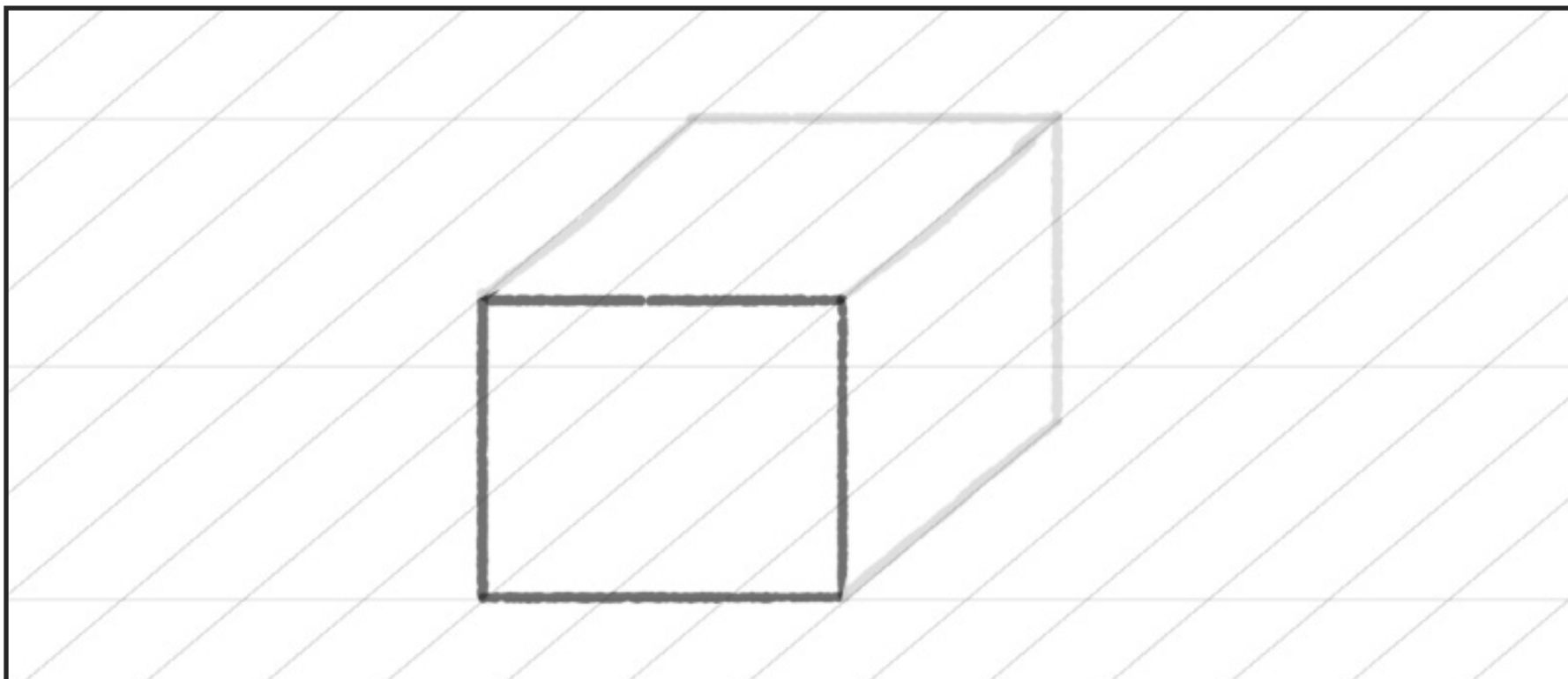
Create a layer above it, we will draw on this. It's a good habit to label your layers as you work, as it will save you time later on.



To draw a box in our chosen view we need to follow some basic rules. Any line that recedes must follow our template guide lines. Any lines that go from left to right should be horizontal and equal in length, and lines going from top to bottom, vertical and equal in length. This will mean that the side lines that make box “A” will be equal to the side lines at the back etc

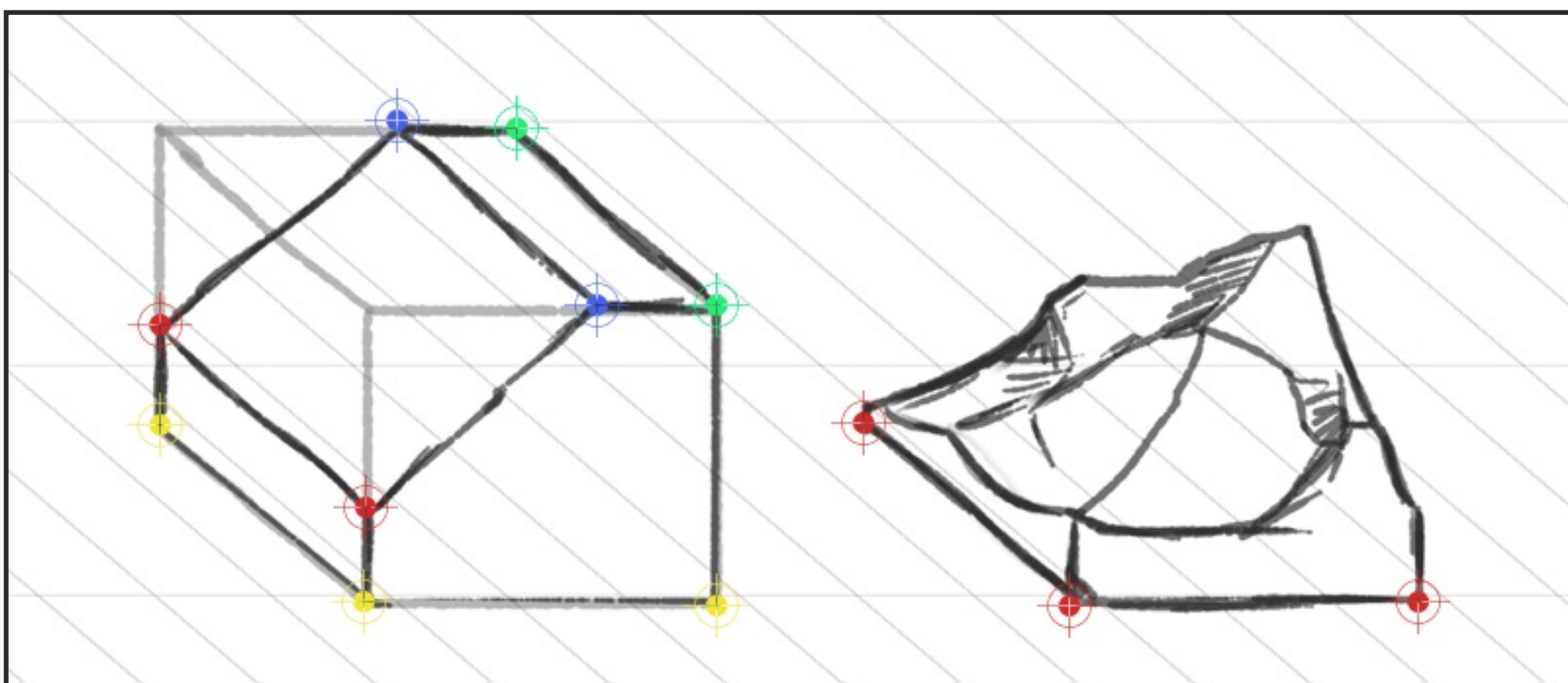


We can also flip the angle of the lines to work the other way. This comes in handy when we want to create steps and would like the view to show the play as continuous. You may also want to display from this angle to go back on game play.



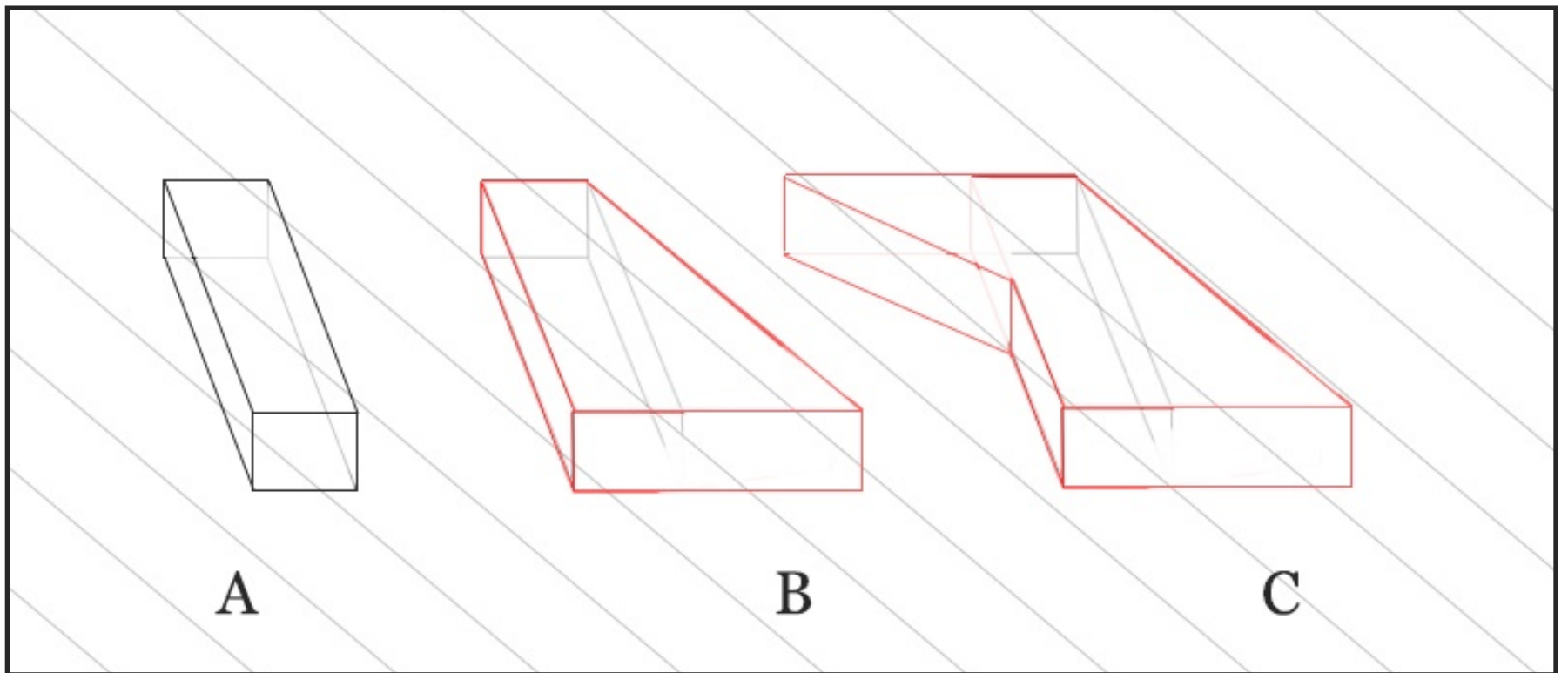
Lets cut our block up a bit, as not everything we want to create will be this simple. The main thing to remember is to keep some of the lines of your drawing aligned to the grid, this will make them look correct. When we lose reference to the ground plane, objects start to look strange.

Take a look at the block in the next image, breaking it up works because we have reference to the lines of the ground plane. Even if it is minimal.



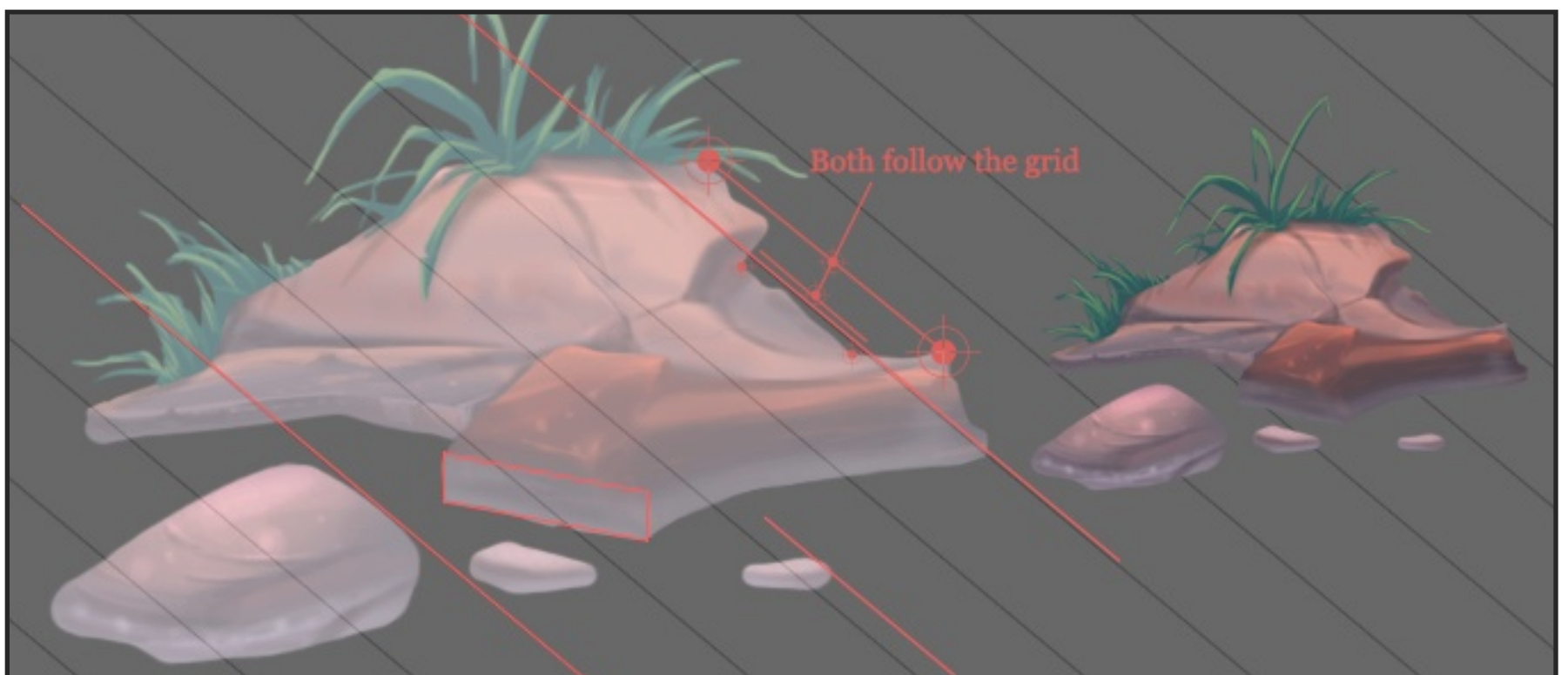
The points show where the corresponding line start and end.





Above I have created a box at an angle to our grid lines in “A”. The box is correct, all lines are parallel. The lines are also equal in length. However the box looks wrong, so in the next two images “B” and “C” I have added lines that follow the grid lines, and the images are starting to look correct to the ground plane.

The key to these drawings are to keep lines that correspond to each other at equal lengths, find areas that you can use the grid lines and work them into your drawings. The eye will follow them better.

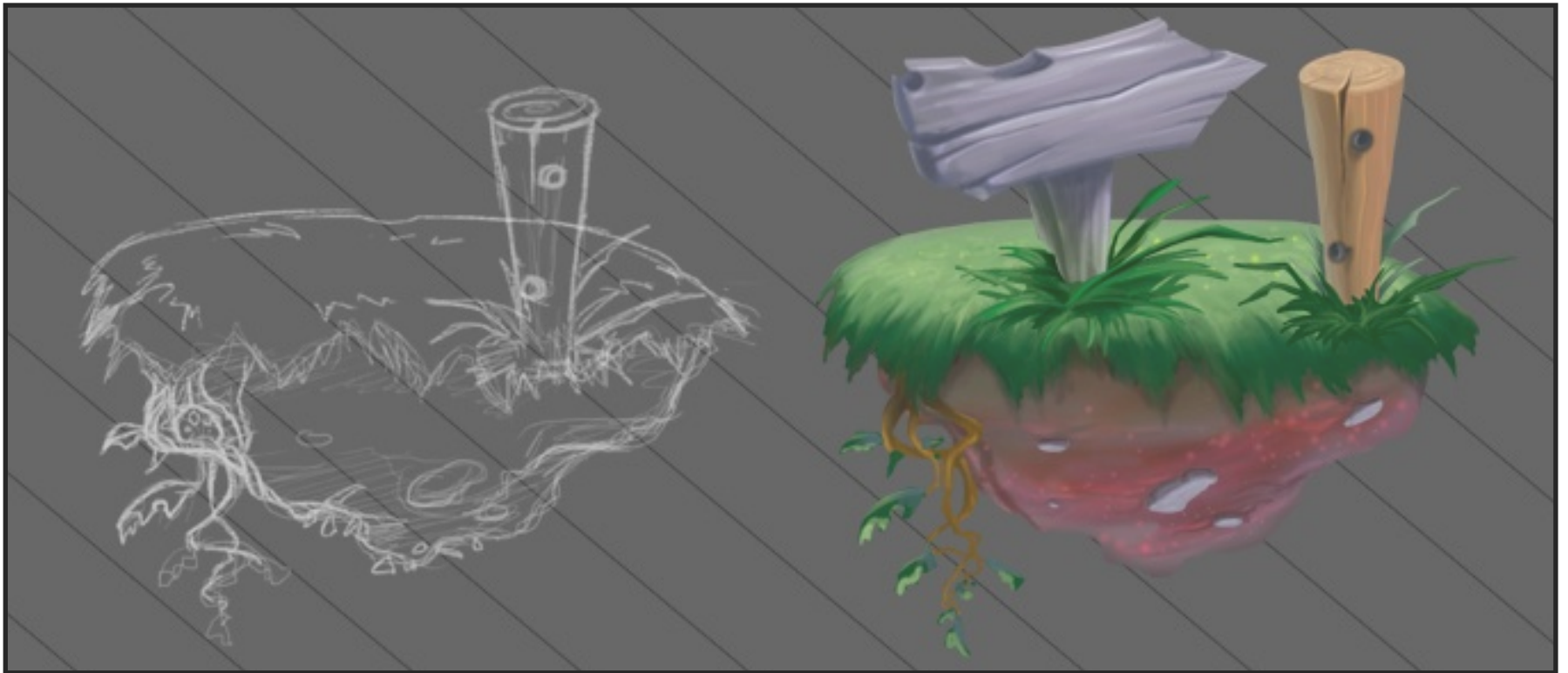


In more organic shapes the alignment maybe a more subtile touch, and reinforcing them with other objects helps pull them together. Find areas to keep the vertical lines

the same size. The starting points or tips can lay on the grid but the lines between may fall or rise to form the shapes you are creating.

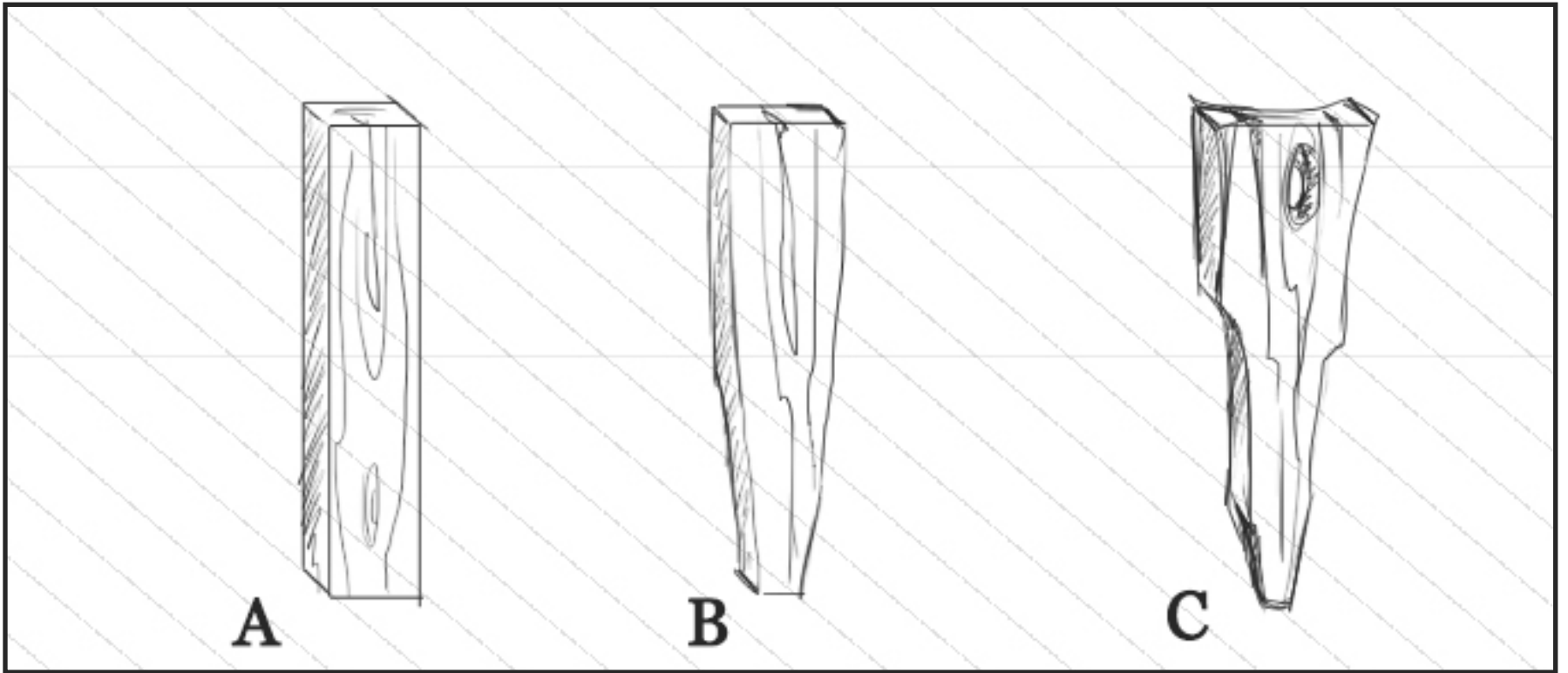
Below are samples from my 2d tiki toon asset on the Unity asset store. You can view some files and a movie of this by following the link.

<https://www.assetstore.unity3d.com/en/#!/content/18327>



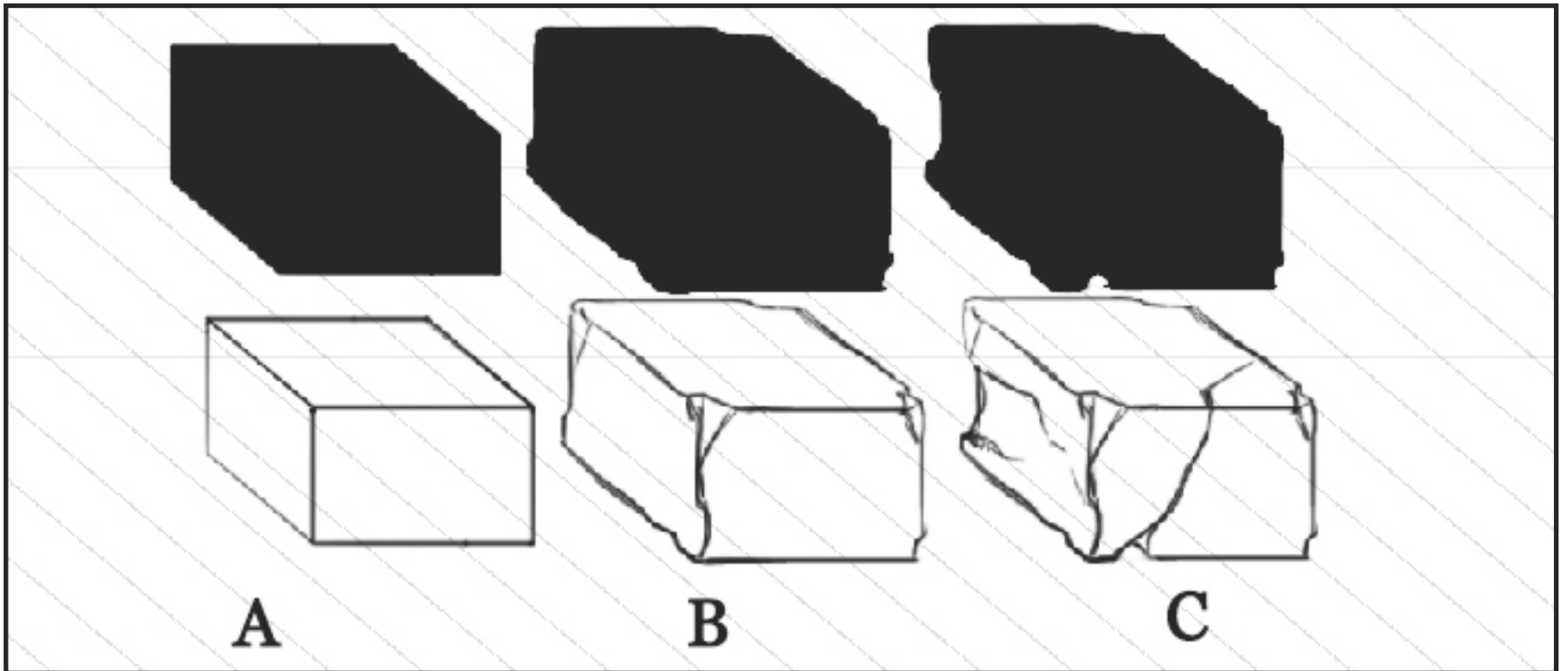
So lets take a look at drawing assets and some ways to make them more interesting. At this juncture I should say that I use a graphics tablet to draw directly into photoshop. Theres nothing wrong with old fashioned pencil and paper either just print out your template to work with and scan in your artwork.

Below is a quick drawing of a fence. “A” is technically correct, however “B” is more interesting and “C” even more so. So lets break it down. I find that objects that stick into the ground should taper, almost like they are sharper at the base, and wider at the top its more attractive and playful to the eye. Always consider the silhouette value of the asset you are drawing. Is the shape recognizable, are there any negative spaces that you could add or exaggerate the asset.



It's always a good idea to keep away from lines that run parallel to each other on either side. In "A" the fence post is parallel, in "B" I have changed out the lines on either side of the post so they are not equal on the left and right, this makes for a more interesting shape. In "C" I have exaggerated this idea further by making the lines left and right different but also the lines front and back different. I have also drawn a knot hole in the top and taken some nicks out of the wood. The idea is to look at the characteristics of the element, in this case a wood post, and push the lines so they are not a direct reflection of each other on either side while keeping the essence of the asset. The same principles apply to the next image of a block.

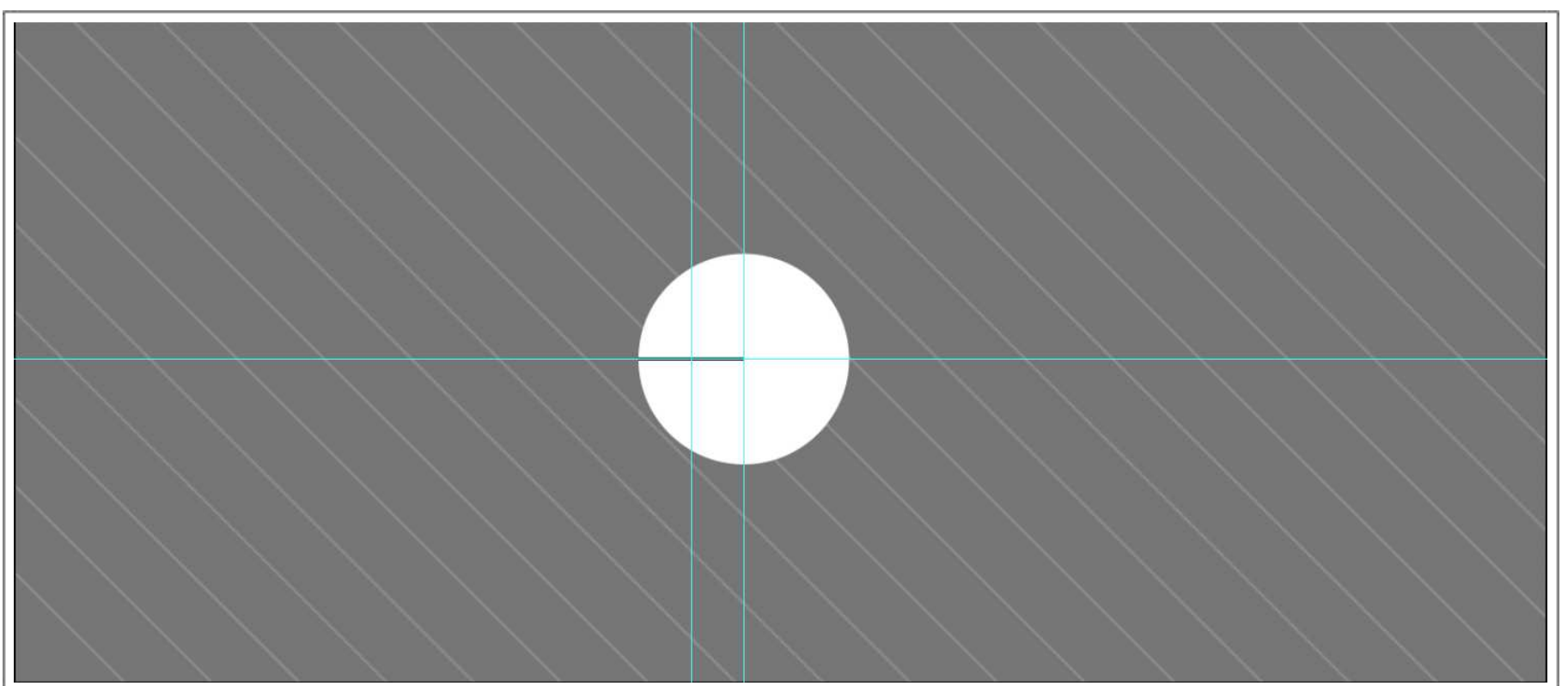




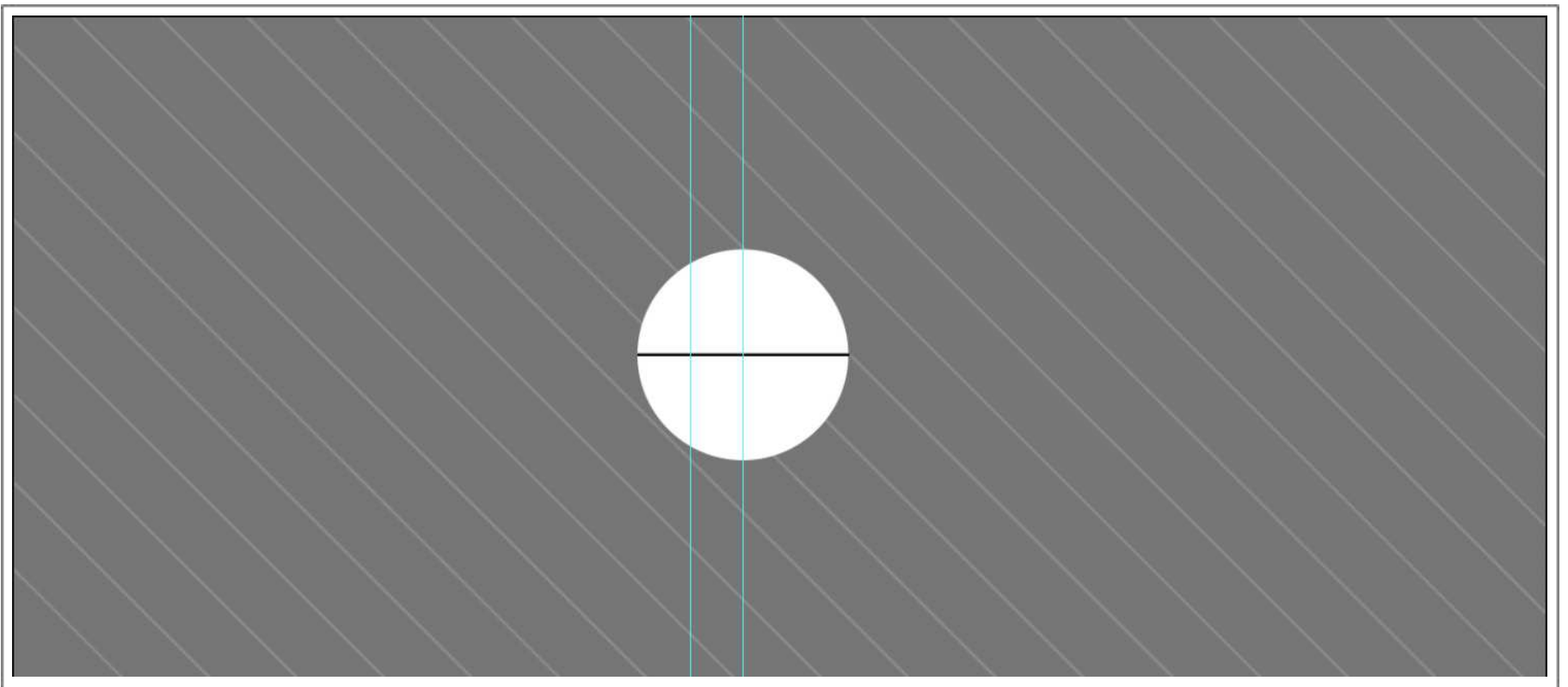
In the above image “A” could be a wooden box, concrete block, cardboard etc “B” not so much, and that’s because of the internal lines. They are angular and sculptured in shape. “C” is really a more worn down block with lumps taken from it. If you also consider this block to be a building type of block it has been shaped this way, as against a stone or rock you may see at the beach which is smoother and weathered. So think about the outlines and the inner lines of your drawing. The outer lines define the shape and boundaries the inner lines define the character and story.

### ***Circle on the plane***

Organic shapes can be more forgiven when drawn like this. However they will all need



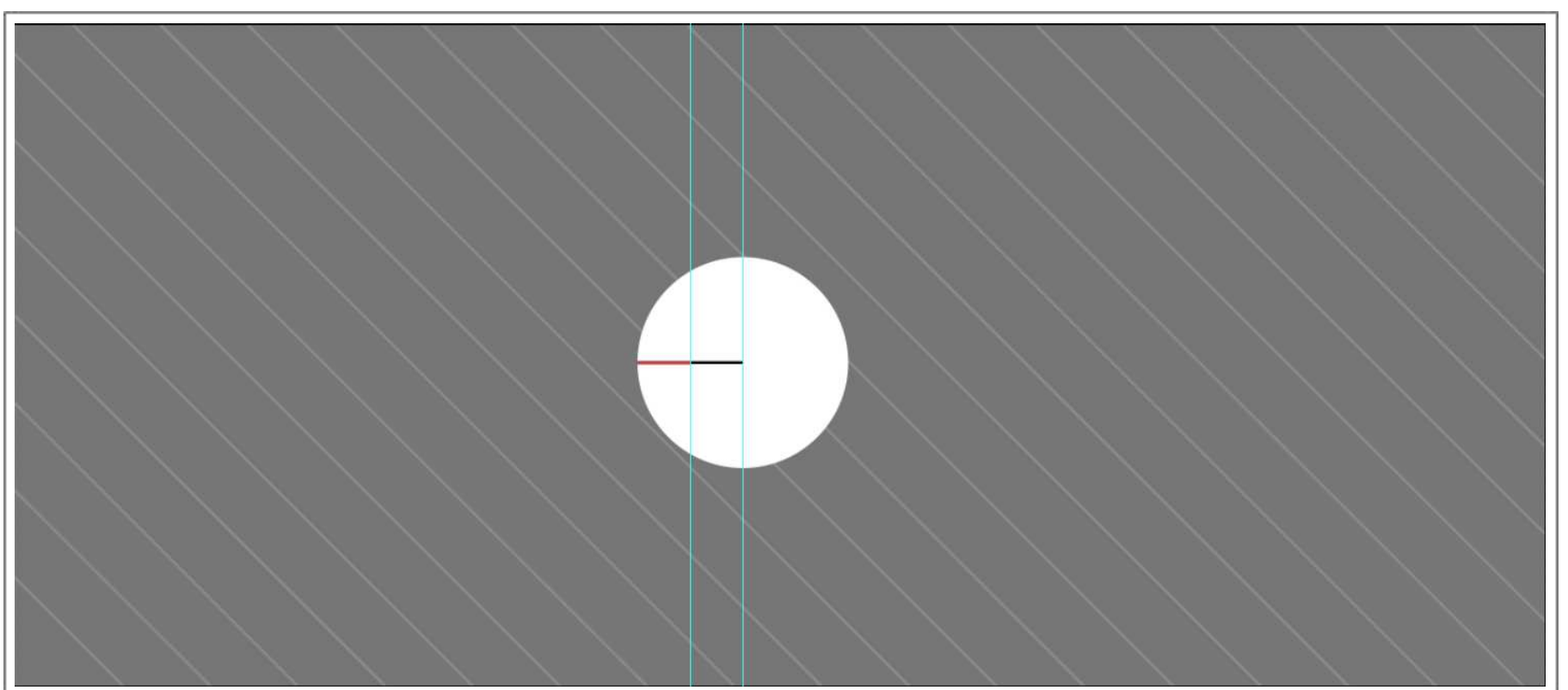
to sit on the ground plane and look like they fit. Also what if we want to draw a circle on this plane. This is a bit tricky to get looking right. However there is a solution.



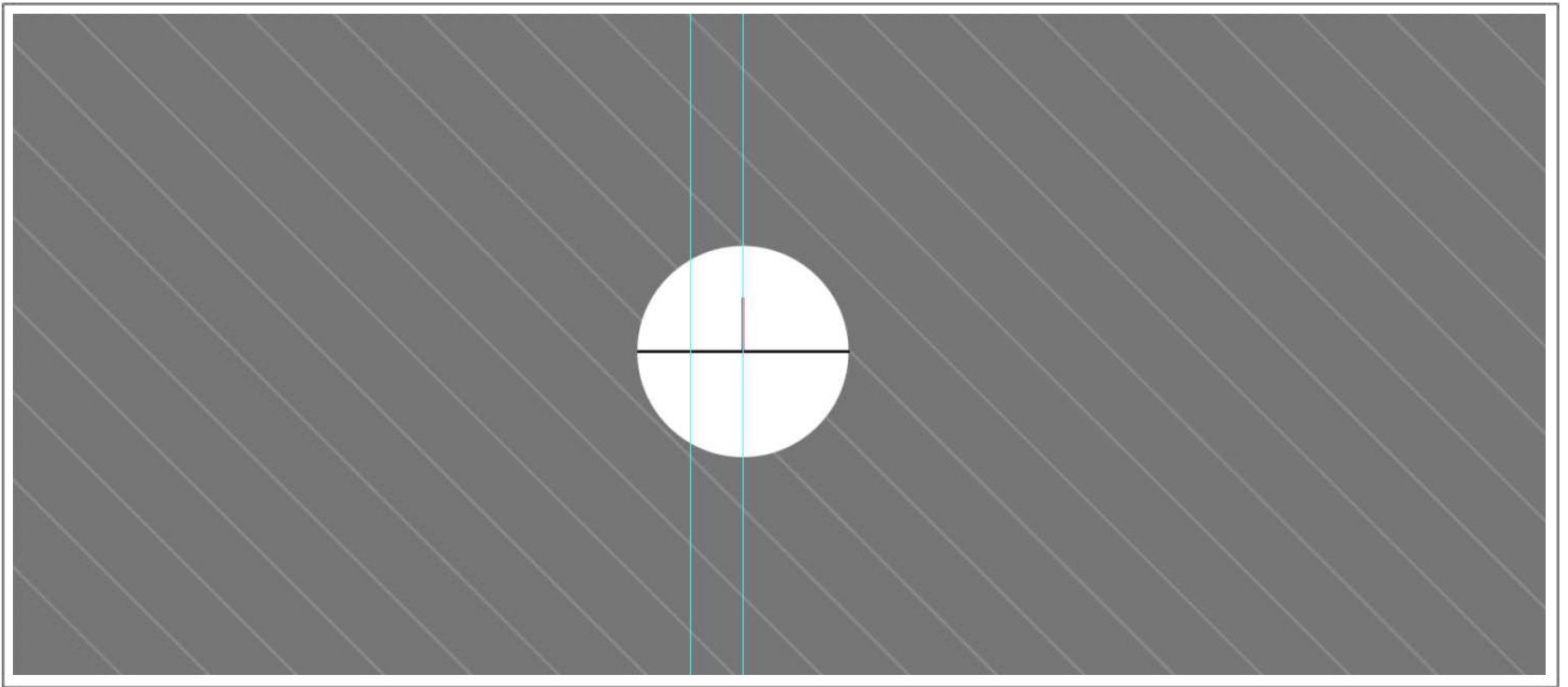
Draw a horizontal line half the width of the circle you want to create.

Duplicate the line, and move it to the right to match up with the right side of the first line. Where they touch is the centre of your circle.

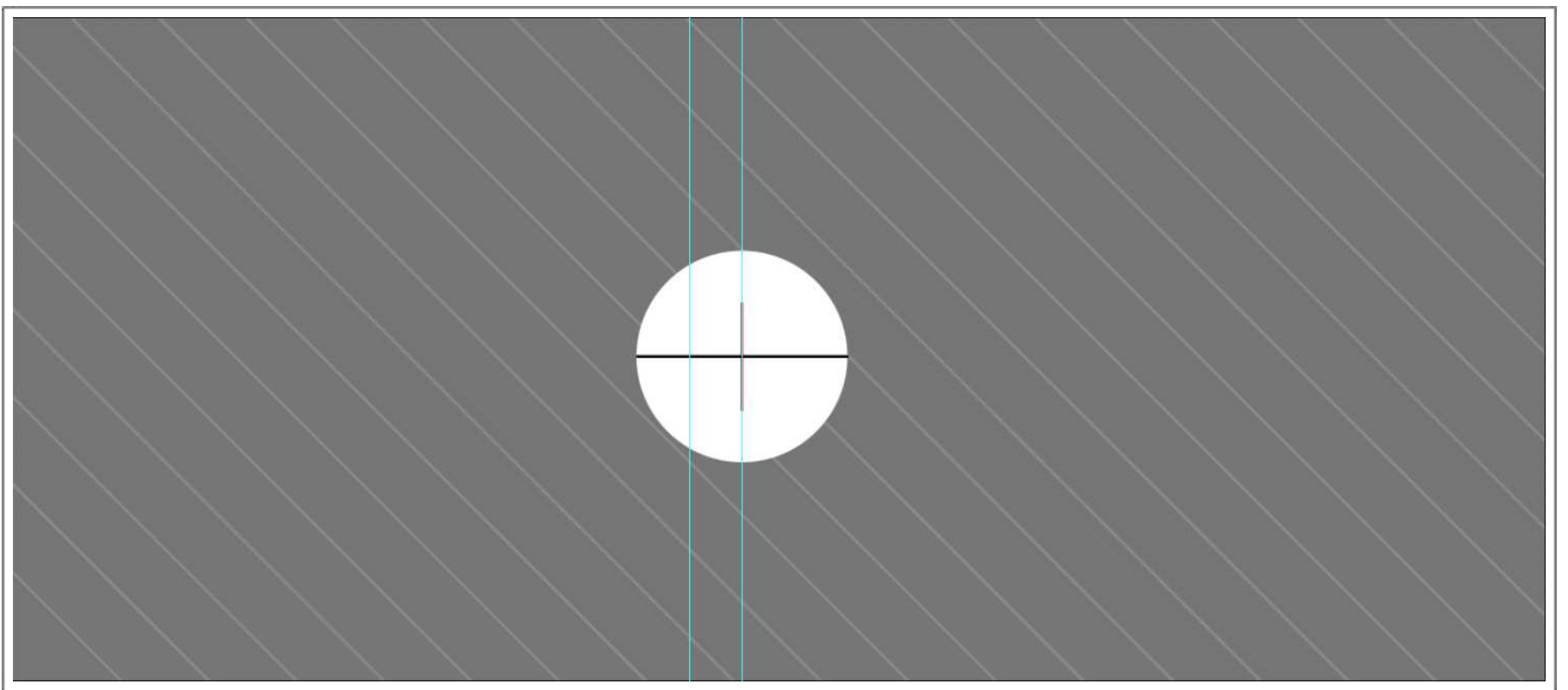
Select the first line you drew and turn on the snap under the view menu. Go to the left



side of your screen where the rulers are and pull out a guide line. Move it over the line until it snaps to the centre of your line.



Create a new layer. Draw out a horizontal line from the left edge of your first line to the



centre or where the guide is.

Transform the new line till it is vertical. Move it to where the two horizontal lines touch, the centre of your circle. So that it sits above the horizontal line.

Duplicate it and move it below the horizontal line. So that it forms a cross.

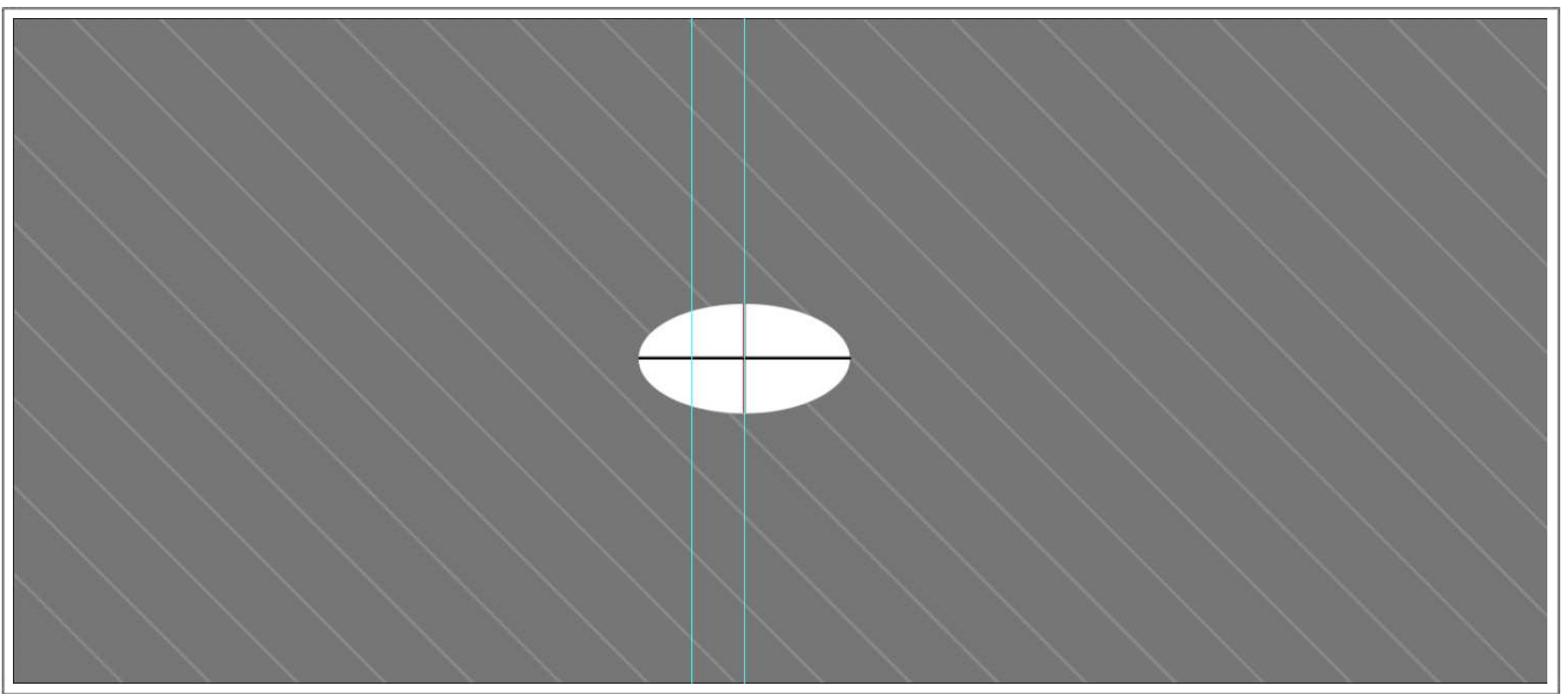


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Select the circle tool and create a new layer. Drag out a circle so that the top of the circle touches the top of the top line, the bottom touches the bottom of the bottom line and the edges touch the furthest left and right points of the horizontal lines.

We have now constructed a circle that sits well on this plane. So what can we do with that?

Lets imagine you have a pot that sits on the floor plane. To construct this is much easier with the circle you have drawn. Follow this tutorial and you will see how this technique could give you all kinds of shapes and assets.



### ***Pots and Vases***

With the circle you have just created selected. Alt left click and drag, to make a copy of the circle. Drag it straight up so that it sits directly over the first circle.

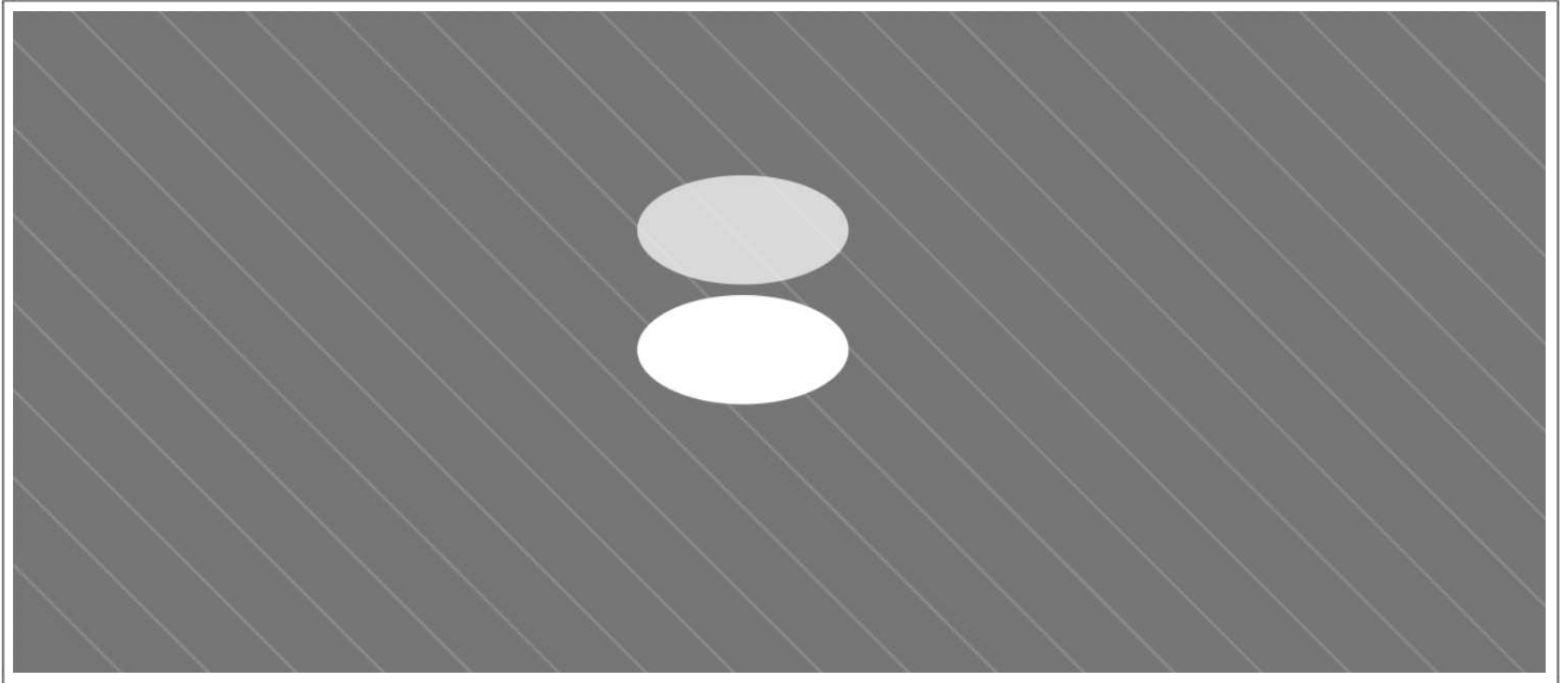
Transform the circle by holding Ctrl + T, the transform tool will be visible. Let go of the keys.

Move the cursor over the bottom right box. The cursor will turn into an arrow. Hold Shift + Alt and click and drag to make the circle smaller. Shift + Alt will make it smaller in all directions and keep it centered over the first circle we created.

Duplicate the smaller circle, by Alt dragging as we did earlier. Moving it higher above the last circle.

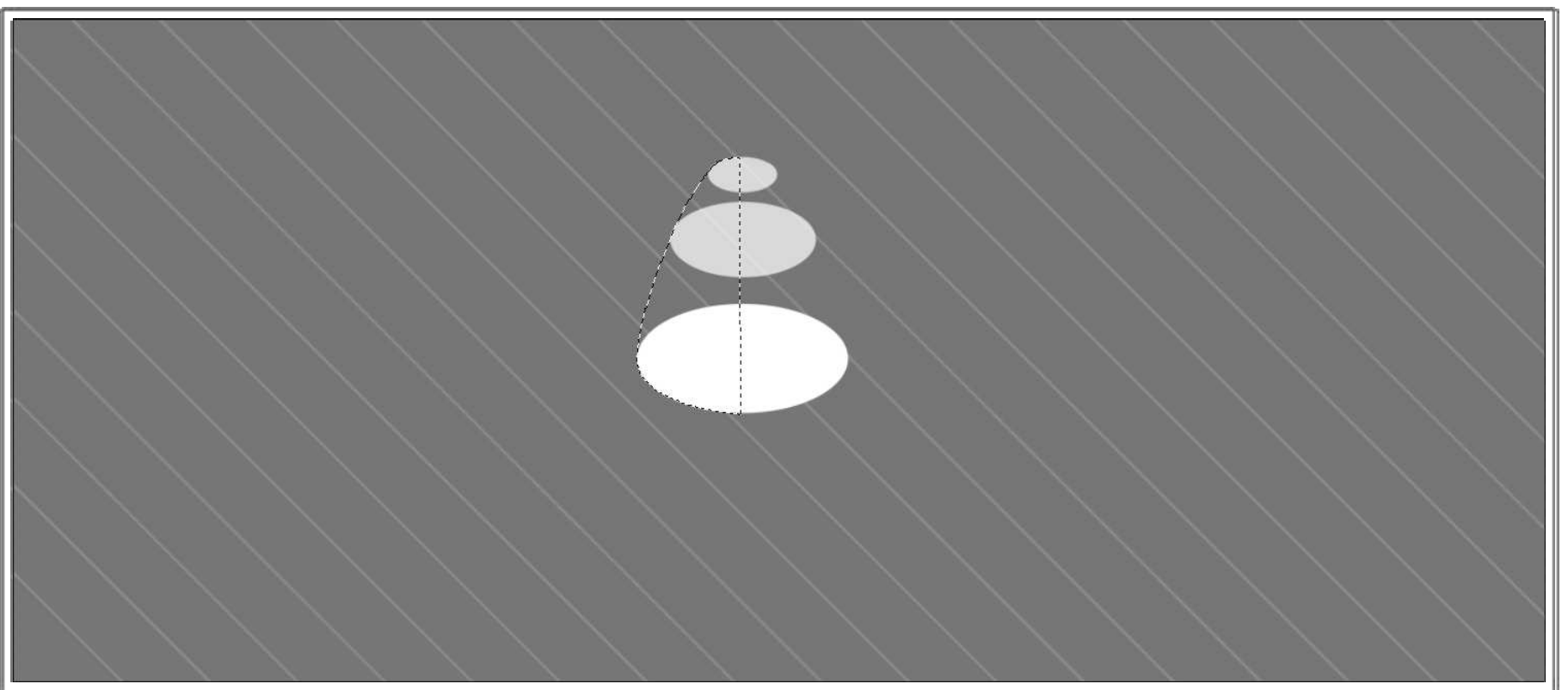
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Transform it till it is much smaller than the previous circle.



Now the drawing bit. For this we can use the pen tool for a more accurate and faster line. Using the outer points of the circles as our guides make a line that follows the base curve of the bottom circle and the outer points of the other circles. Create a selection that is half the vase as in the image below.

Create a layer for this to sit in and fill it with the paint bucket tool, the color is not important right now we will paint it later.

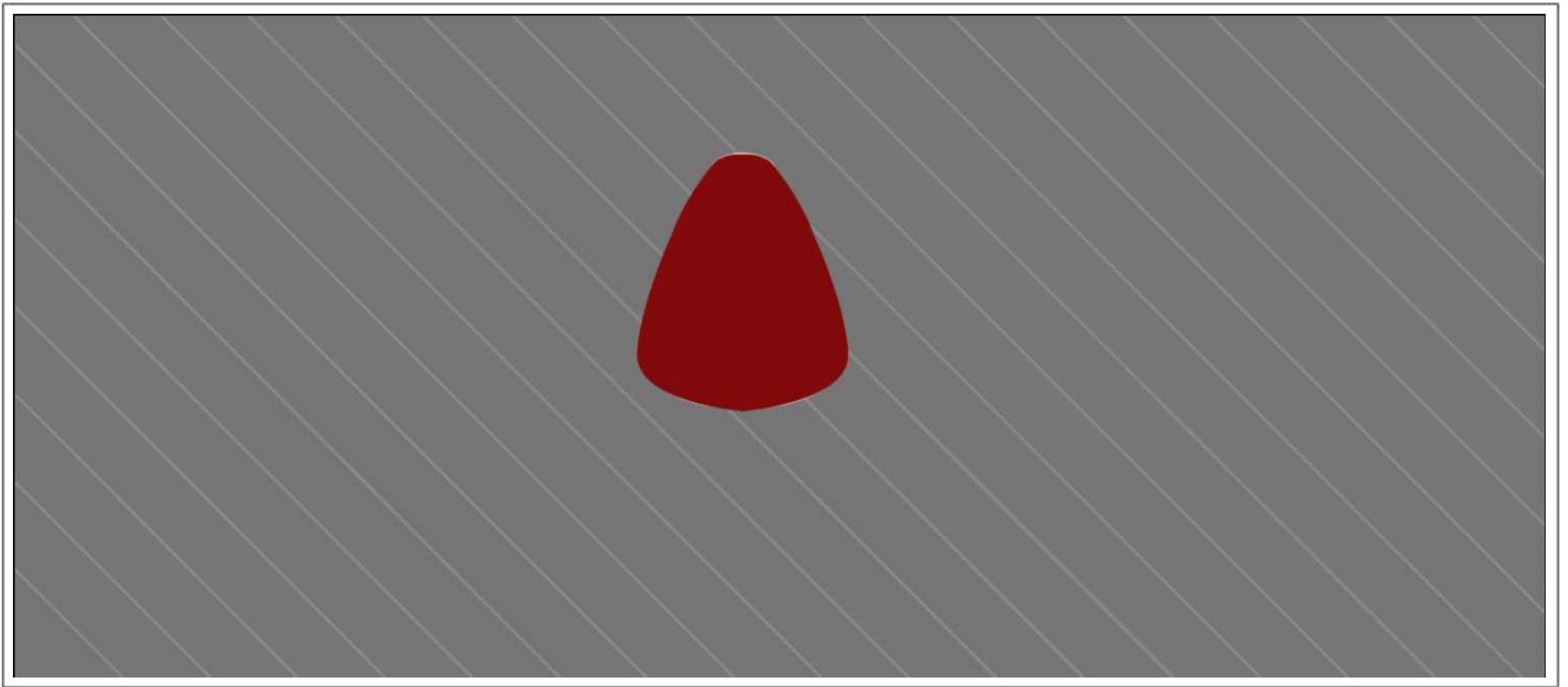


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Duplicate the layer and flip it horizontally lining both up to match against the base circle and each others side. See below image.

When there are no gaps and it looks lined up merge the two layers into one. We now have the outline of our vase.

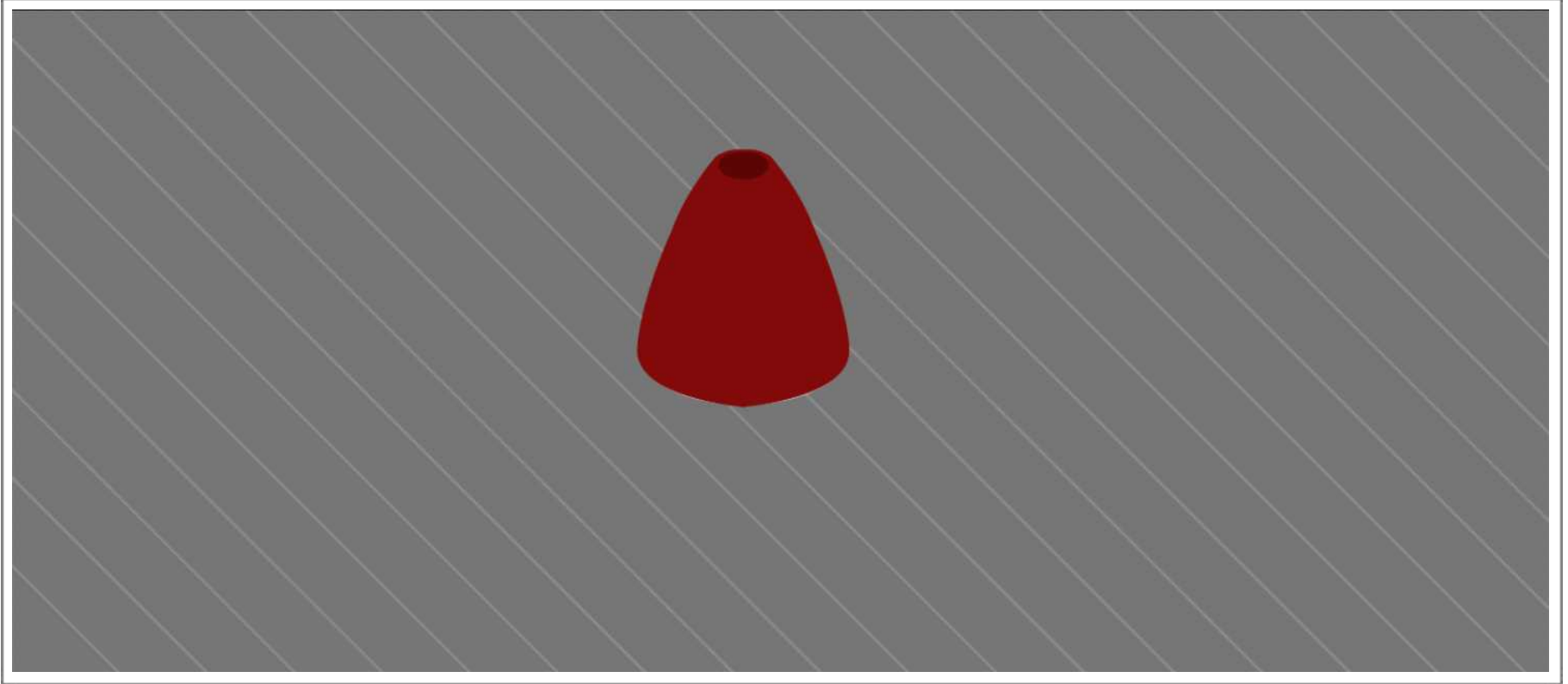
Bring down the transparency of the filled vase so we can see the original circles.



Using the top circle we will make the opening for the vase. Select the top circle layer. Transform it uniformly and make it smaller so it looks like the hole at the top of the vase.

Move that layer above the filled vase layer, and lock the layer. Paint it a darker color than the vase color you used.

You now have a basic shape of a vase that works on that floor plane. When this is painted up to work with your environment it will look great. You can create many pots, vases, barrels, pillars, etc in this way and by changing the outer lines you can create many variations quite fast.

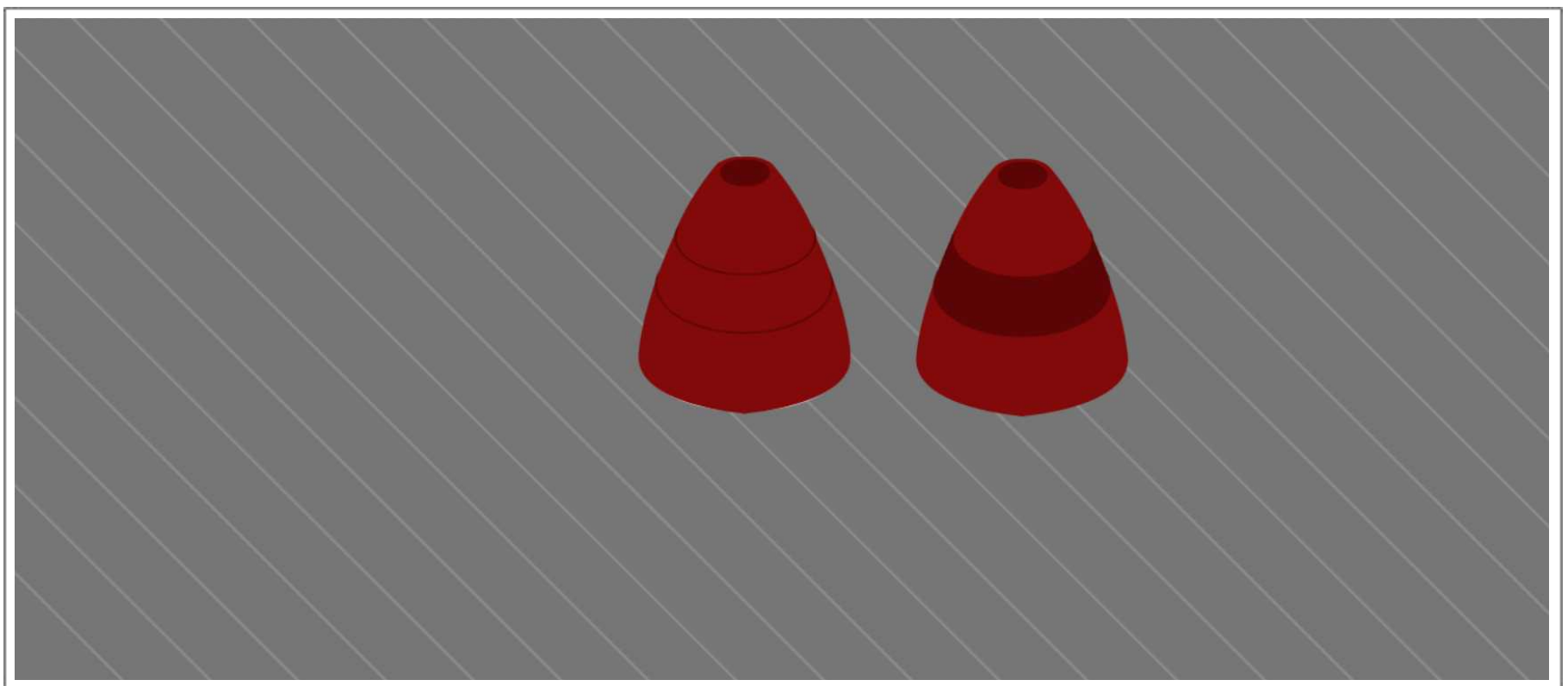


### ***Designs on your vase***

The same technique can be used to create designs inside of your asset. For instance, if the vase I have created had a border around its centre. I could select the circle I used as reference and duplicate it.

Move it above the layer of the vase so it can be seen easily.

Transform it to fit the asset. Then duplicate it again dragging it above the circle till you have the distance you wanted.





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Make a selection of the circle by Ctrl Left clicking on the image in the circle layer you want. Then Ctrl Alt click in the other circle you created for the border, this will make a selection only where the two layer intersect, giving you a border of your vase.

Create a layer and fill it with a color you choose.

If you find that its not sitting exactly inside the lines of your vase. Drag the border layer above your Vase layer and holding your cursor between the two layers, hold Alt and left click. Now it will show only inside your vase layer.

When I develop for 2d games I try to give as much flexibility as I can when creating assets. So I break them up into all there parts so that I can reuse parts of assets with other assets to make new and unique ones. They can be flattened later if you need just one asset, but working fast and efficiently is the key. Learn the short cuts of the program you work with so they are second nature to you. So with practice developing a number of vases in this manor would take only minutes. Below I have created some variations as an example using just the techniques described.



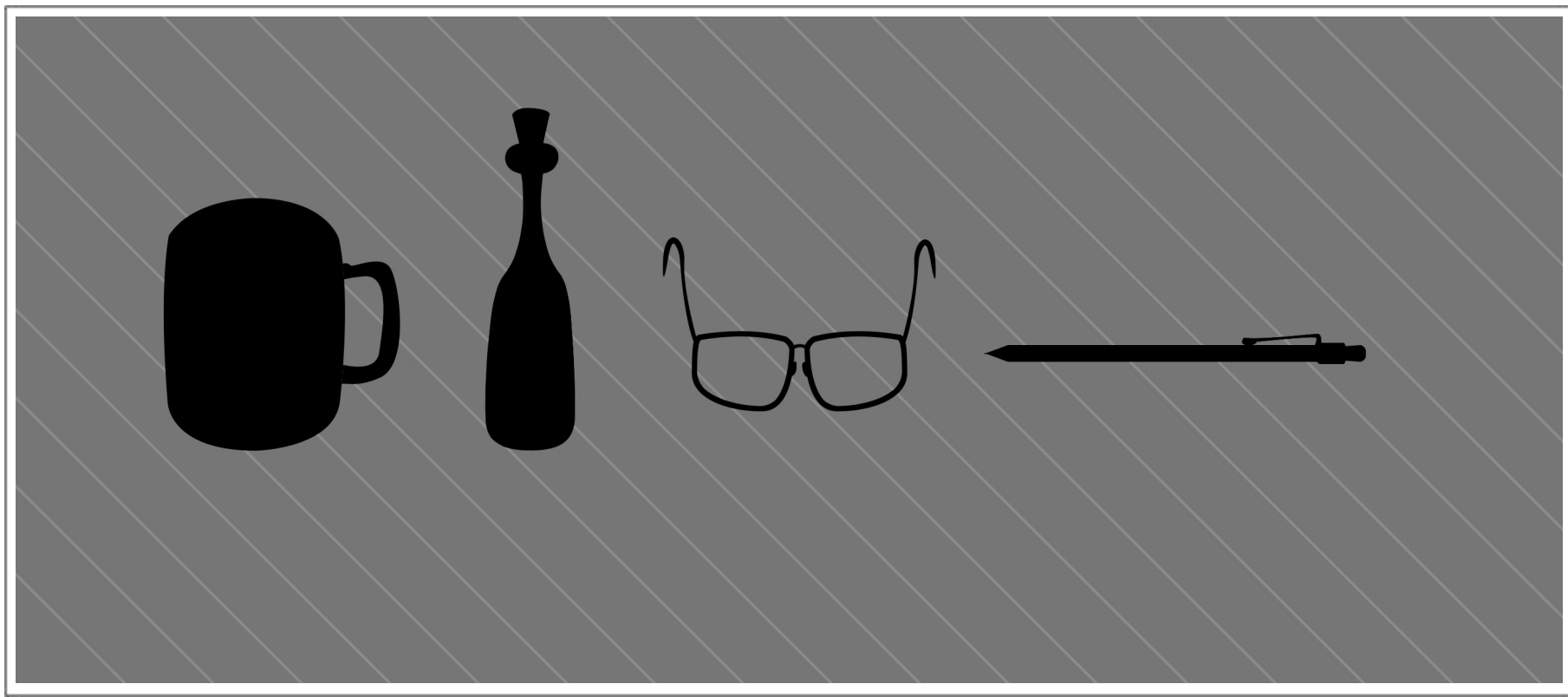
### ***Silhouette Values***

What is a silhouette?

A silhouette is the outline of an object without color or lines to describe its character. Below are some objects that are in silhouette. Some will be more recognizable than others. Their characteristics will tell you what they are. The cup has a handle and a shape that

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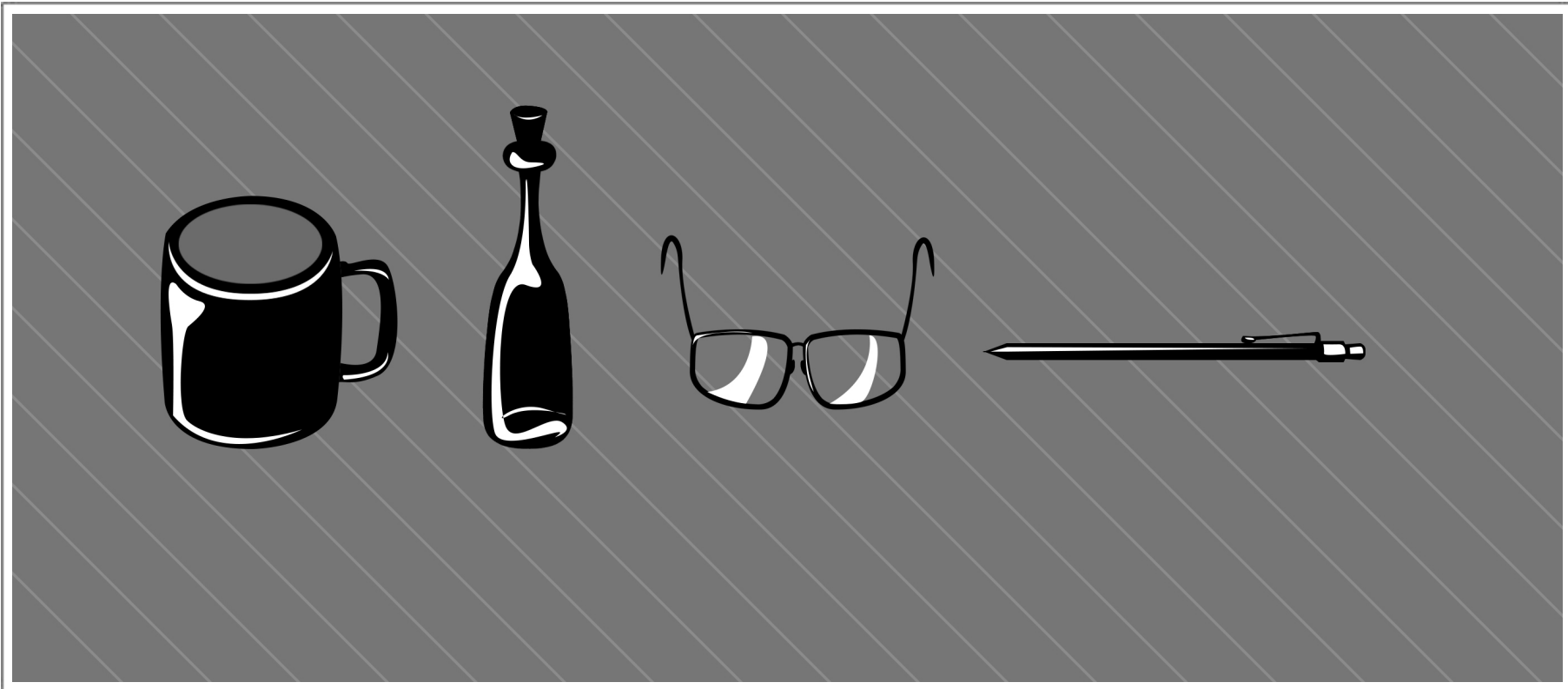
serves its function. The wine bottle has a cork and shape that is universal in wine bottles, etc. Its important that when we look at silhouette's that we also look at the negative space around the object. Both are equally important at describing the object. The white space inside the handle of the cup, the space inside the spectacles. They all describe the object without seeing any detail.



Each asset that you create should have some characteristic that are displayed in its most basic form before the internal lines start to define it more. This can be used in gaming to a great advantage, either to trick the player into thinking one thing is not what it really is or visa versa.

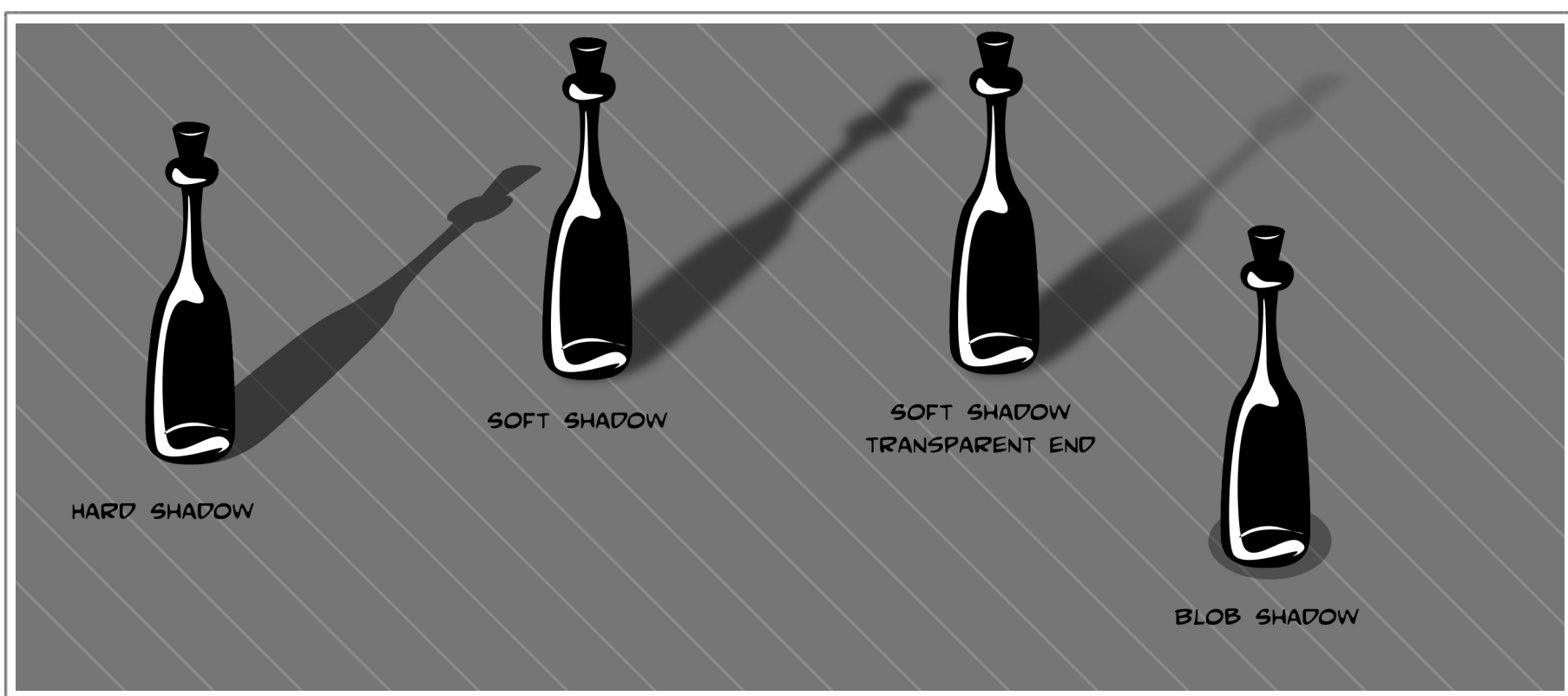
So its good drawing practice to think about this as you create your assets. Try to draw an outline and imagine it blacked in like the images above. Does it look like the object you want to create. What attributes could you add or subtract to make it more recognizable. Look also at the negative space around the object, and observe any alterations that could be made to bring you closer to your goal.

We can take this further. Using simple highlights we can make the objects even more recognizable. This starts to move the objects out of the flat one dimensional look and starts to describe volume and character. Have fun with this and practice it observing objects from reality. Then start to play with the shapes to see what character you can get into them. In the next chapter I will show you a simple painting technique that will bring your assets more life. However always keep in mind that every drawing starts out simple like



the silhouette's above. By defining the highlights and tones we can make it easy to do some basic color.

Shadows can ground an object to a surface and stop them from floating. They can be dramatic long dark shadows or a subtle touch. A quick way to create these can be to duplicate the object and transform them to stretch out. Just remember to put the shadow layer under the object layer when doing this. Lock the layer and paint a darker solid color. Below I have treated the shadows in different ways, all have a transparency however the first one I left the edges solid. The soft shadow has a Gaussian blur and then a technique I like to use is to use the eraser with a soft edge brush and make it 25% opacity, then erase the distant



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points of the shadow. I also included a simple blob shadow, the other techniques can be applied to this. There are many ways to create shadows that ground your assets or create dramatic lighting in your games. I always leave the shadows on a separate layer in case you need to change the direction, transparency color etc Each environment will have its own requirements and a look and feel that you are trying to achieve.

### ***Quick Tip Advise***

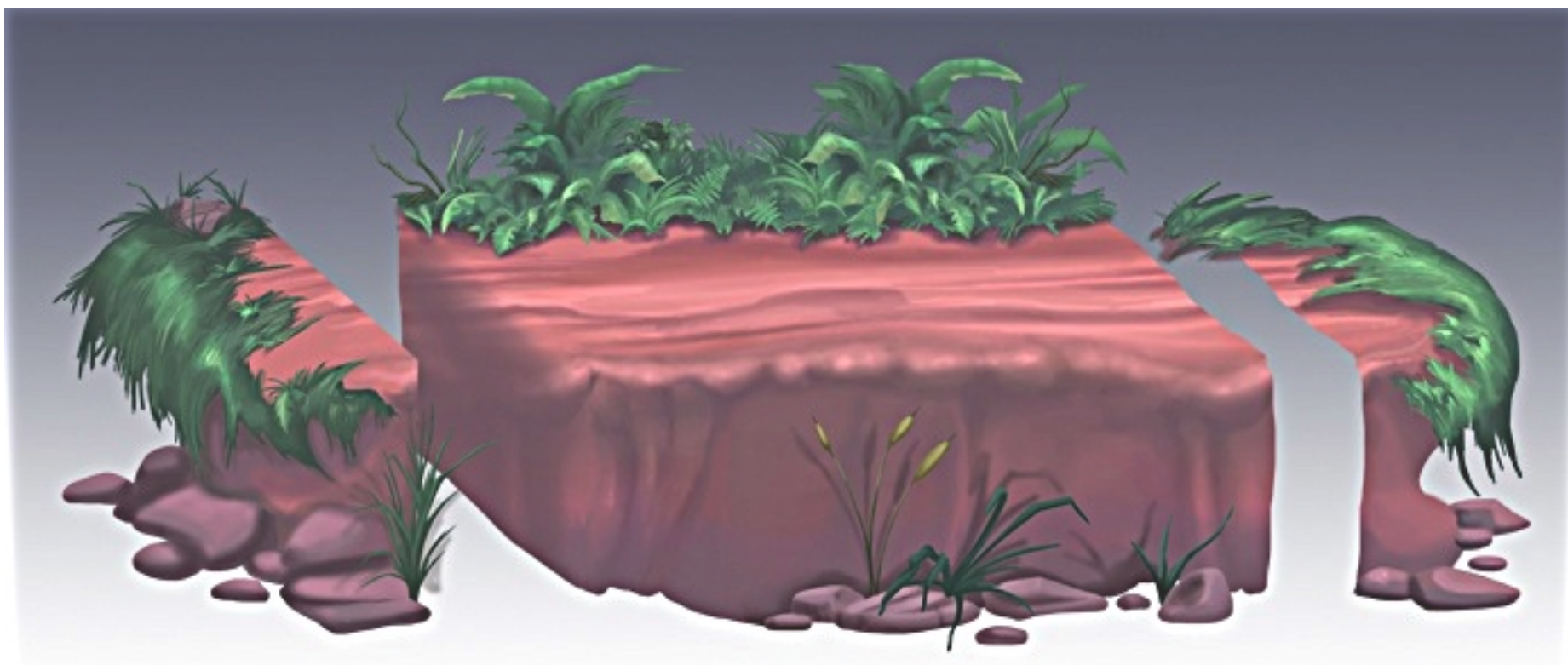
Keep in mind when you are creating an asset that most of them are the same on either side. So duplicate and flip them, match them up, at this point you can add other details or correct any problems you see. This will help you create assets fast and with more accuracy.

Also use the tools that the program supplies. If your drawing skills are not up to the task. The pen tool is one such tool people shy away from all the time, yet it has some very powerful applications. Most of the assets here are created using this tool.

Mix and match how you use these tools. Try to create a vase using the shape tools then use the pen tool too cut out or add to the shape. Use the Marquee tool to cut a hole for the handles etc

Not every asset needs to be hand drawn, there are some very fast workarounds. If you are handy with 3d you can create the basic shapes and reuse them from different angles scale and squash them to get unique shapes to work with inside your 2d program. In the next chapter i will go over some of these techniques and how to start painting your assets.





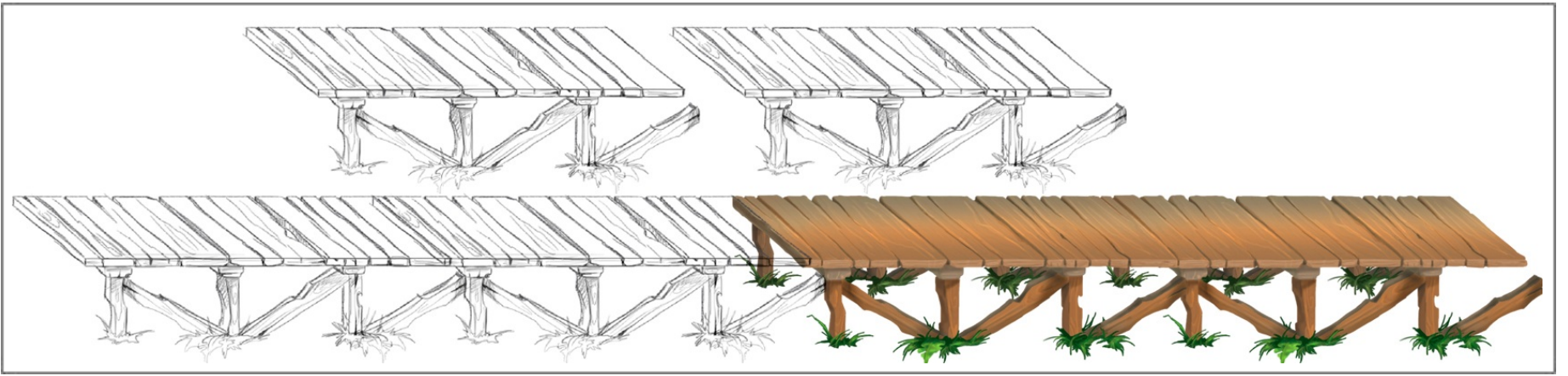
# 4

## Painting & Tiling

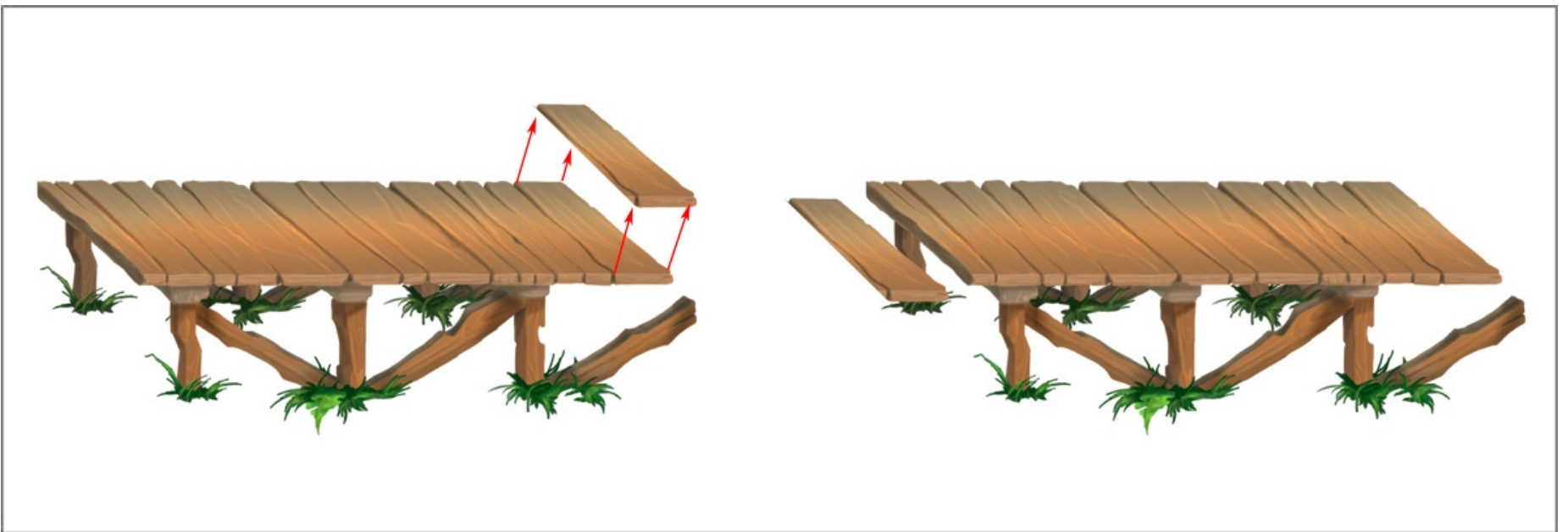
Most of your assets will need to tile. That means that they will have to have a pattern that will repeat in all directions. The trick is to make it look like it is not repeating too much. So how do we make our assets tile? There are a few techniques to make this happen, depending on the type of asset you are working with.

There will be two areas that we need to look at here. The first is our drawing and the second is our painting of that drawing. I am not going to get into different styles here, except to say that simpler line styles will lean on the drawing to make your assets tile. More painterly styles will lean on your painting skills. Either way I like to be tight on both drawing and painting.

Below is a bridge asset I created. You can see where the asset is repeated at the ends. I allowed for the support to buffer up into the notch holding the bridge up on one end. Either side will match. This is a simple example because of the lines that make up the planks don't have to directly match. The color is a little more involved as the gradient

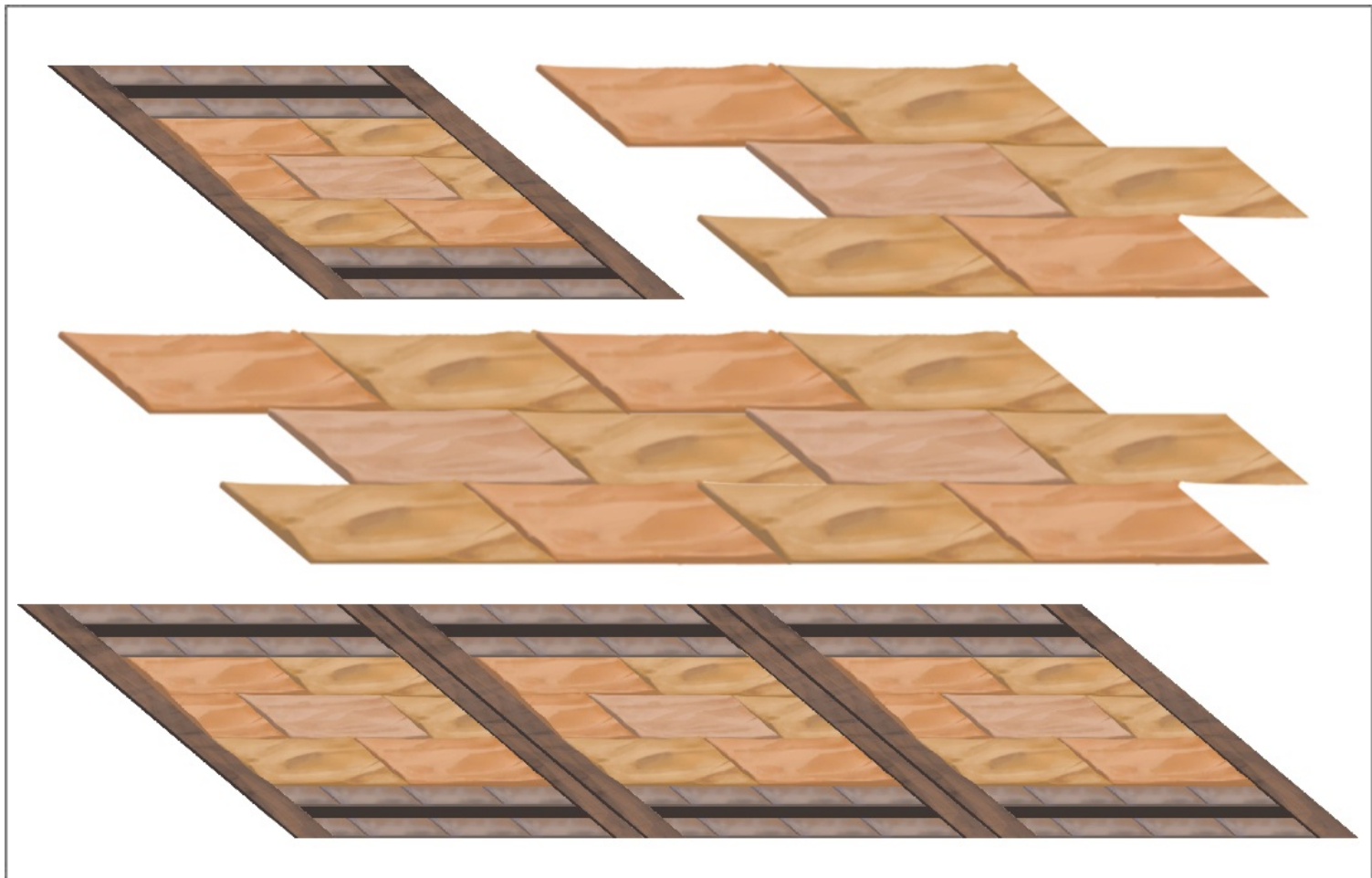


down the centre has to be an exact match on both ends, or it will be obvious where the repeat is. Two ways to make this work. First you could hold the shift key and paint with a soft brush in straight lines. Second, the centre of the painting between the ends can be random, as its not matching to anything. So only the ends need to match. In this case I can cut the color from one end and copy it over to the other end and finish the sides to complete the bridge. I can even make the plank a different shape with notches, etc as long as I don't alter where the gradient sits.



Other examples of this would be floor tiles. Create one and duplicate it, change the color slightly, put a border on it, etc. There are numerous combinations and styles you could create. The main thing to keep in mind is how they will fit together either end. A square tile wont cause much of a challenge, however the repeating may be too obvious, so try to break it up with props and maybe a version that is broken, lay down a carpet etc The image below shows two simple tiles and how they repeat. Just with these tiles you could have a complex floor design by mixing and matching.



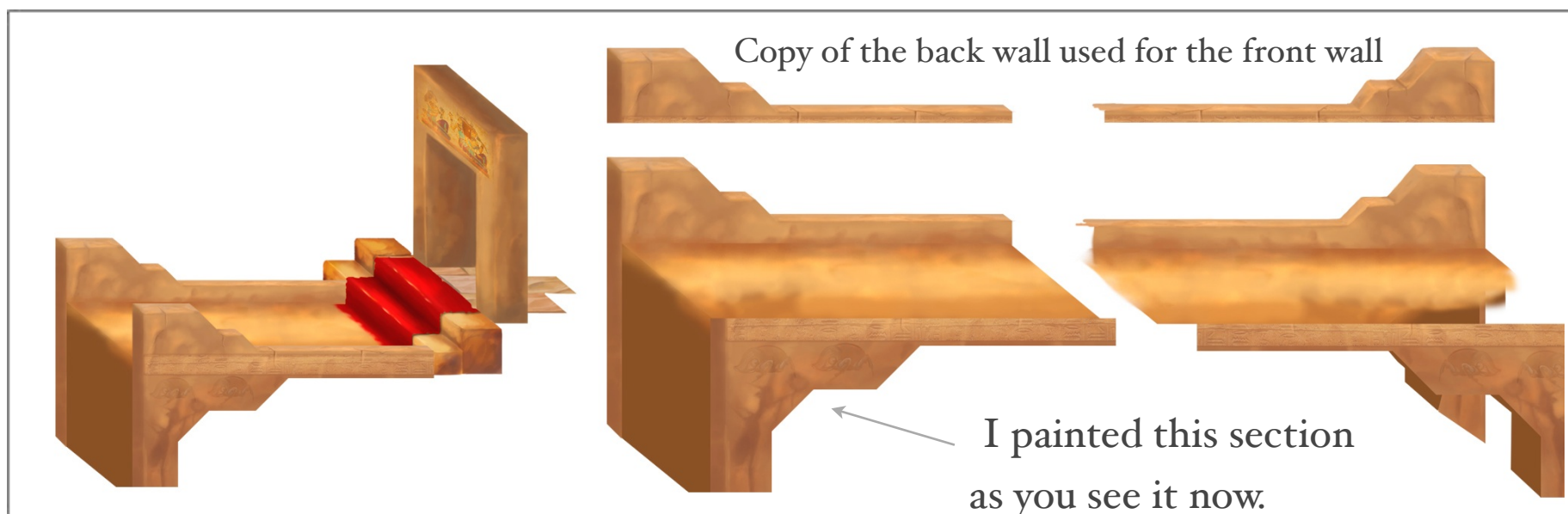


So let's take a look at something a bit more complex. This bridge has a lot going on. The game characters will need to walk behind the front wall. So this is a section on its own. I



also wanted to be able to put the bridge up against a door way or steps, so I split the bridge in half. The image below shows a sample of the bridge running to a door, and how the sections have been painted.

So the process for painting this and making the sand on the bridge match up is very simple and quite a fast process. I painted the left side of the bridge first without the front wall. As you see it in the image below. Then cut the back wall and used the copy as the front



wall, I am sure you see it now. I then duplicated both the platform and the wall and flipped them horizontally. Now at this point the angles of the right side will be wrong, so I turned on my grid template and painted in the correct angles and cut away anything that did not work. This way the two sides of the bridge will match perfectly. All except for the sand texture. To correct this I lined the two sides up and created a top layer that blended over the top, merged them and cut them in half again, so I had two sides of the bridge. When creating matching textures that have a cut like this its also a good trick to smudge out some areas to help with the blending on one side. The images will be transparent png in most cases so the smudging will help to cover any edge lines left by photoshop.

Other ways to break up tiling that is obvious or becoming boring in game play are to create props that sit over the tiling asset. For instance the bridge can have boxes or grass growing between the boards etc, these could be overlays. See below image as an example.

You could even create a dirt map and place it in sections of the bridge to change out the look as you cross it.





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So far I have talked about tiling assets from left to right. With this method of creating games you are not limited to left and right game play so consider creating assets that can go top to bottom as well. Although this is 2d, there is scope to create the illusion of depth and space. I have painted the steps at two angles and tiled them to create the illusion of north south east west game play. You could flip the side steps to use them to travel up if



you needed to. Also by adding a carpet as in the above image of the same steps the tiling can be broken up and the environment made more interesting.

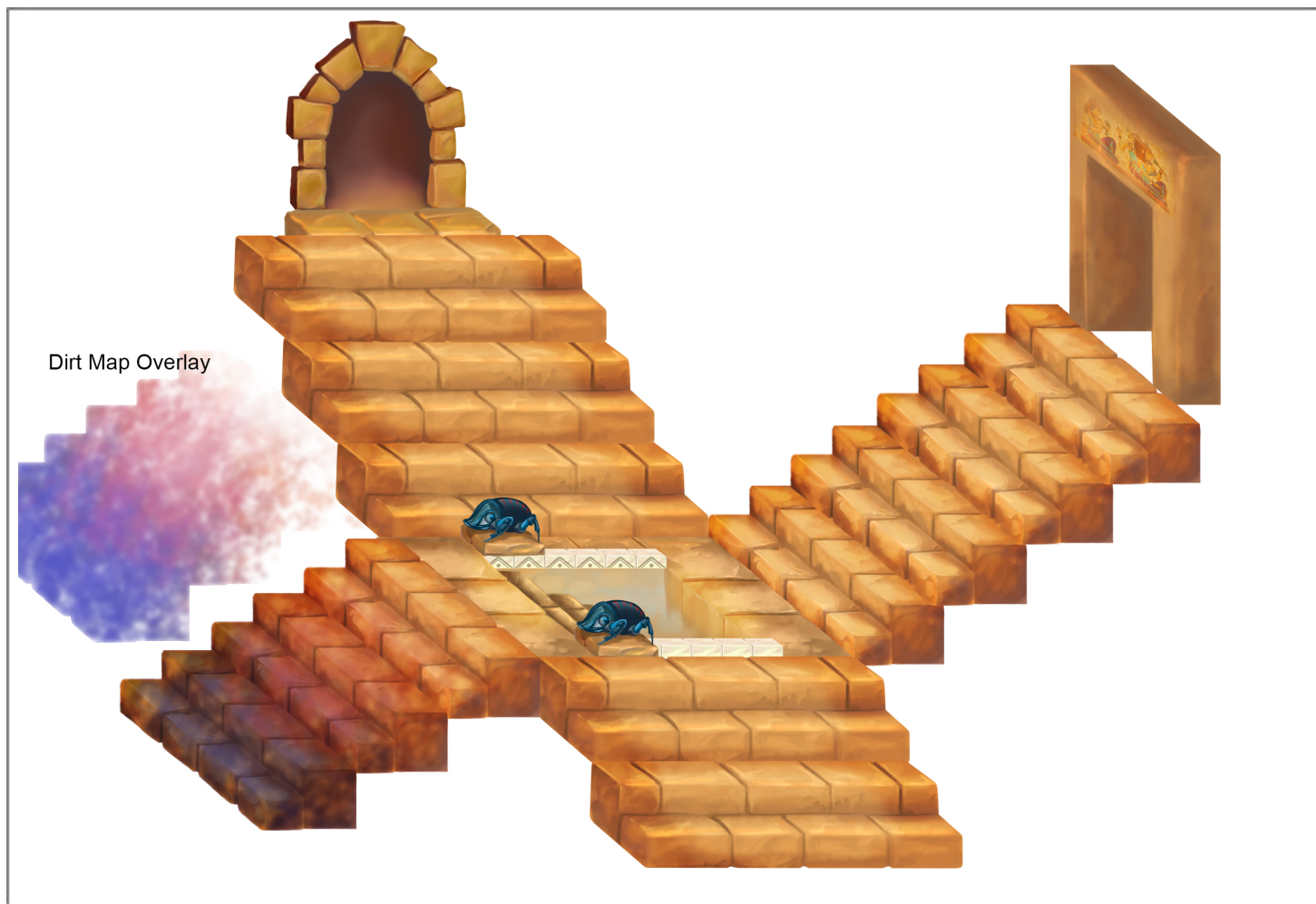
Here are two links to movies that show some of that flexibility using these assets.

<https://www.youtube.com/watch?v=fBN48boz8sQ>

<https://www.youtube.com/watch?v=tBM-D-O9VYk>

When you create a game level its always good to change out the color of your assets as you progress. Some areas may be happy creepy or down right scary, etc. There are a few ways to do this. One is to play with the color of the lights that illuminate your scene and see how this effects the assets you have painted. Also, there would be less assets to load than if you changed the color of an existing asset and used it twice. Another way is to create a dirt map to overlay on your asset. This option gives you some flexibility, if you turn it off, it could look like the lights just came on, or you could use it to spot light an area in your scene.

See the next image for a sample of the dirt map and tiling up and down as well as left to right.



## ***Painting Assets***

There are many ways and styles to paint objects in your games. So I am going to keep to the basics of how I go about creating color for my games.

The first thing that needs to be done when starting into the color process is to find reference images or styles that you like. These could be images from a game you are trying to keep the style of or some images from a painting or a movie. Get as much reference around you as you possibly can. Paste the images to your walls and or create a folder with reference images that you can refer to at will. The next thing you will need is a color wheel. Stick one to the wall in front of you so that you can glance at it quickly. Photoshop's color wheel is very handy as a reference and if you are trying to get a color match to a color in your image the pop up HUD is an excellent tool, Shift + Alt right click when you have the eyedropper tool selected.

Lets take a quick look at the color wheel.

Its made from three Primary colors Red, Yellow and Blue.

Three secondary colors Green, Orange and Purple. The secondary colors can be made by mixing two Primary colors.

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And another six tertiary colors are created by mixing primary and secondary colors. Colors can be spoken about as warm or cool, and the wheel is divided in half by them. Some characteristics of warm colors are they tend to come forward, towards you. They tend to be more vibrant and energetic. Cool colors recede from the viewer and retreat into the background or go away from us. They are more calm in nature.

When you are mixing colors it's good to know what way you are doing this, and what effect you are trying to get.

If you add white to a pure color, you get a tint.

If you add black to a pure color you get a shade.

If you add gray to a pure color you get a tone.

We will create assets that have to work in our game environment. They may be copy and pasted from one place to another so we have to have a consistency to the way we work. This means we need to understand where we can create areas of intense color and areas of more neutral tones.

It's a bit like placing light over dark or dark over light. If our background is full of intense color we may not want our foreground the same intensity. Otherwise we would have a game cluttered with color and hard to define areas.

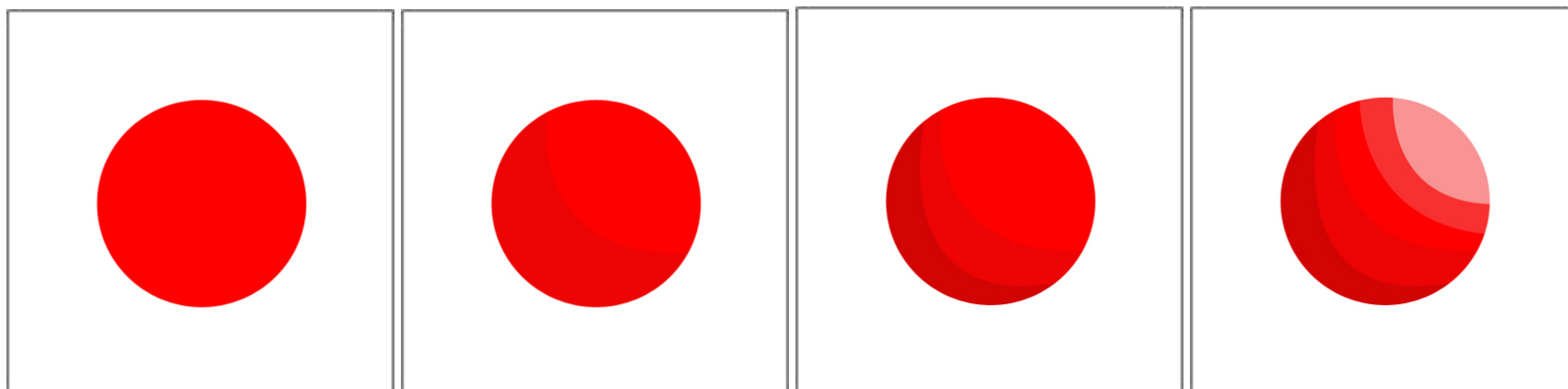
### ***Painting tricks***

There are a few simple tricks that can get you the results you are after, even if you don't have magical painting skills.

Don't over complicate the amount of colors that you use, keep it simple. Let's take a ball and paint it a flat red color. Consider that this red ball will have a light on it, and if it has a light it will have a shade. To create this shade select the color red in Photoshop in the color picker. Move the color selection a small distance into the darker reds. The trick is not to move it too far away from the first color.

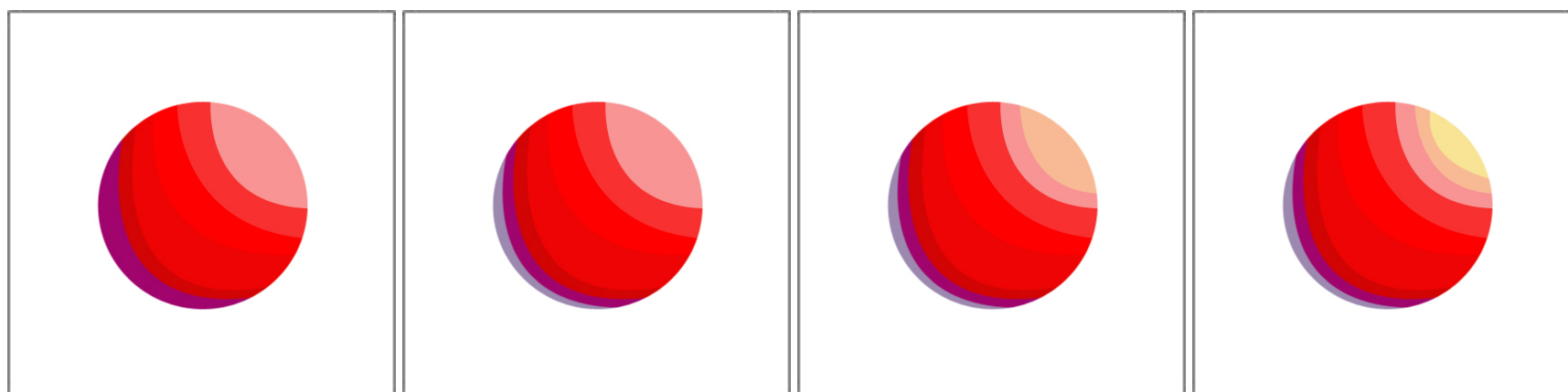
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Repeat this till you have the effect you require, however don't over do it. The next thing we will do is put in the light. So pick the base red color again and start to move it toward the brighter reds. This is a simple way to build up light to dark, however there's no vari-

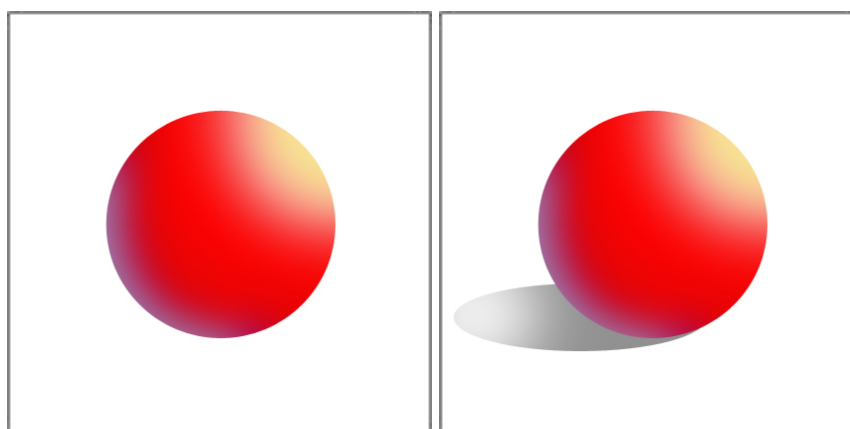


ance of color so it looks very boring and flat. Lets take a look at our color wheel, and remember that cool colors recede, which is what we want to happen in the shadows.

We know that purple is a secondary color to red and is cooler, lets use one that is not too striking but just cools down the red. Another tip is that anything that moves away from us



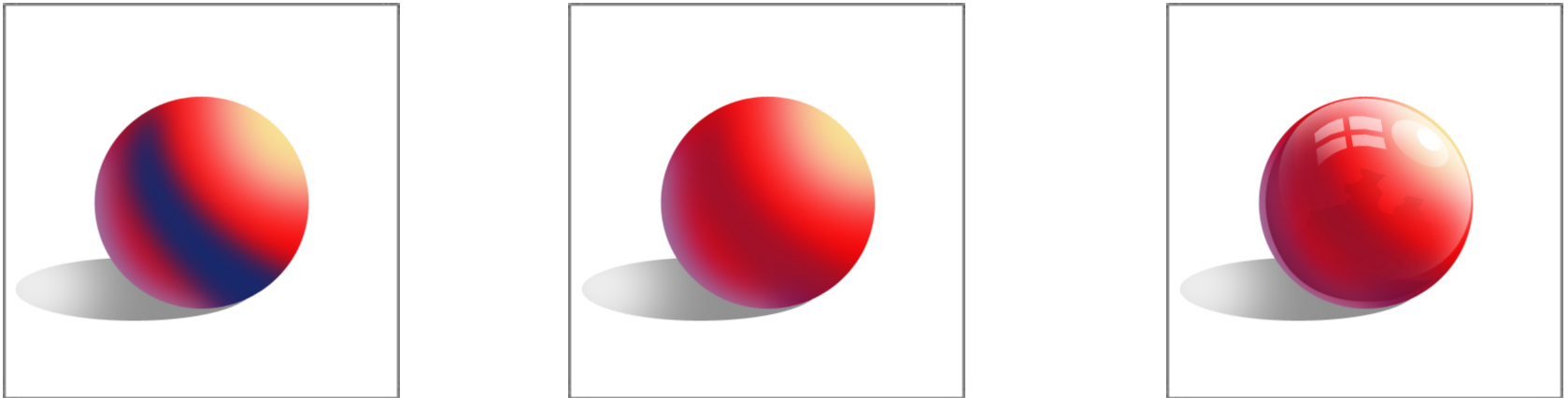
starts to desaturate. Color pick a gray in the purples that you like, this will help the ball take shape. However we need to do this with the brighter colors as well. As it happens, to get red warmer we go into the bright yellows. Follow the color wheel. I don't recommend blurring and over blending, but the ball becomes easier to see in this case, as the light moves to the darker areas. Don't forget a drop shadow for effect.





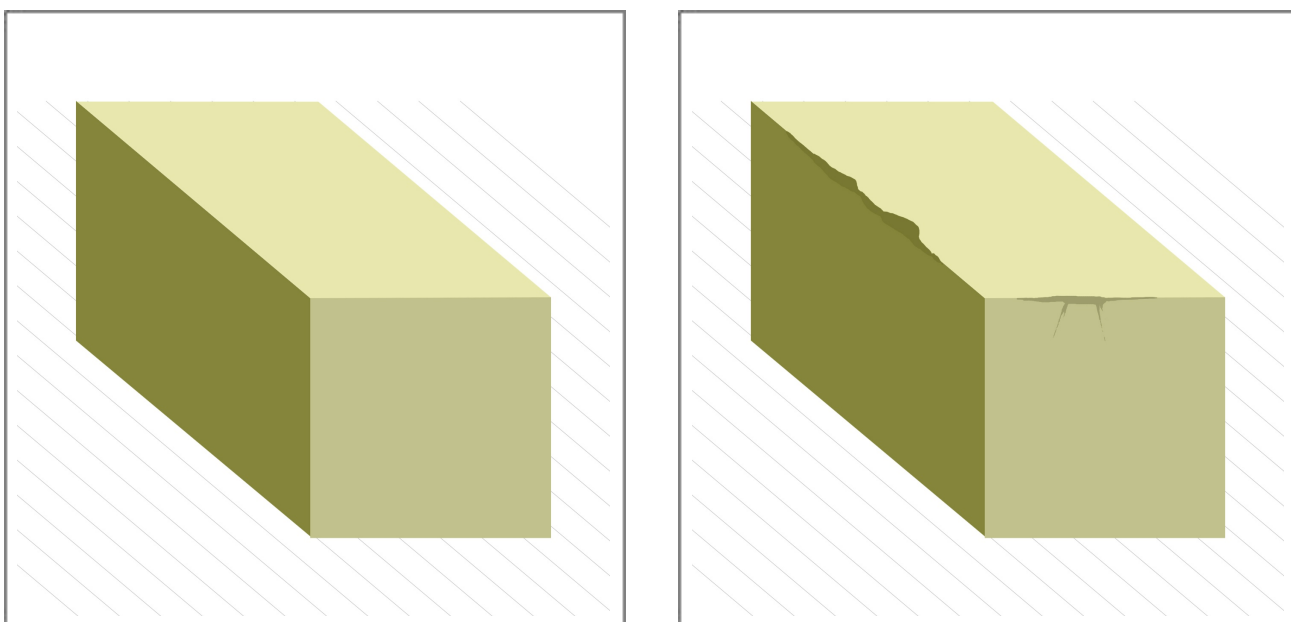
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Any asset can be painted in this way for your games. If you want to get a bit more from the shadowing and toning remember that you can overlay color in photoshop and knock back the color by adjusting the transparency or the blending modes of the layer, letting the underlying color bleed through. I did this here with the blue color on the ball below.



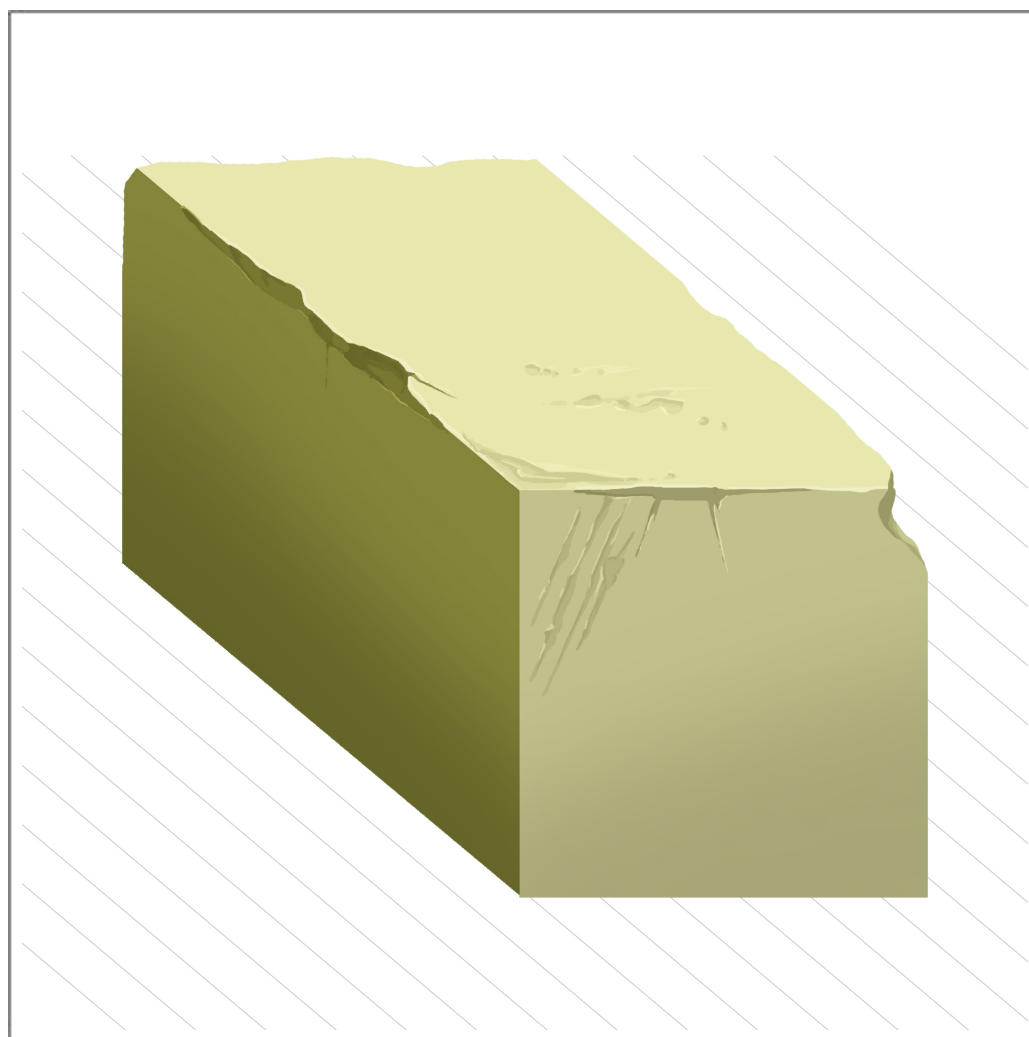
There are many other ways of embellishing assets, it really depends on the look you are after. Adding extra hi-lights and shadows, reflections etc all add dimension to your assets. However remember that it also adds time to an art schedule.

Below I have created a block, to show how simple light and tone can create effects on objects. Each color has been picked as a lighter or darker tone of the color beside it. So I started with three base colors, front top and side. I then used the side color and darkened it a little to etch a shape into the corner at the top and the same principal for the front. So

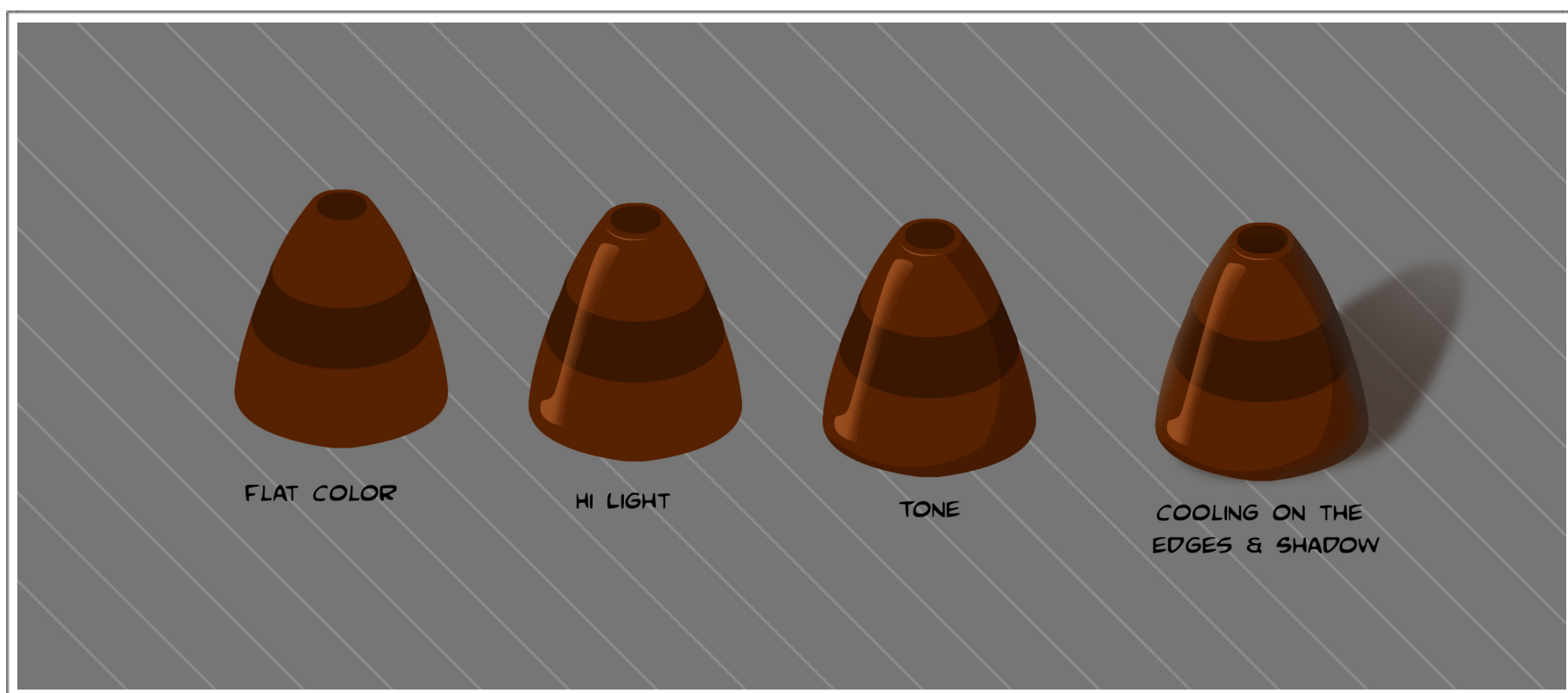


using a base color with a hi-light and tone we can create an indentation on the block. As with the ball you could add more color to this following the color wheel from cool colors to warm to add some life to the asset. Practice is the key to getting this right. I usually

work with a solid brush with Shape Dynamics turned on and control set to pen pressure, this way you get a nice taper on your brush strokes.



In the previous chapter I showed how to draw an urn or vase. I wanted to show some simple color applied and the steps involved. This is not over rendered and I choose to keep this very simple to demonstrate that 2d painting can be as simple or complex as you wish



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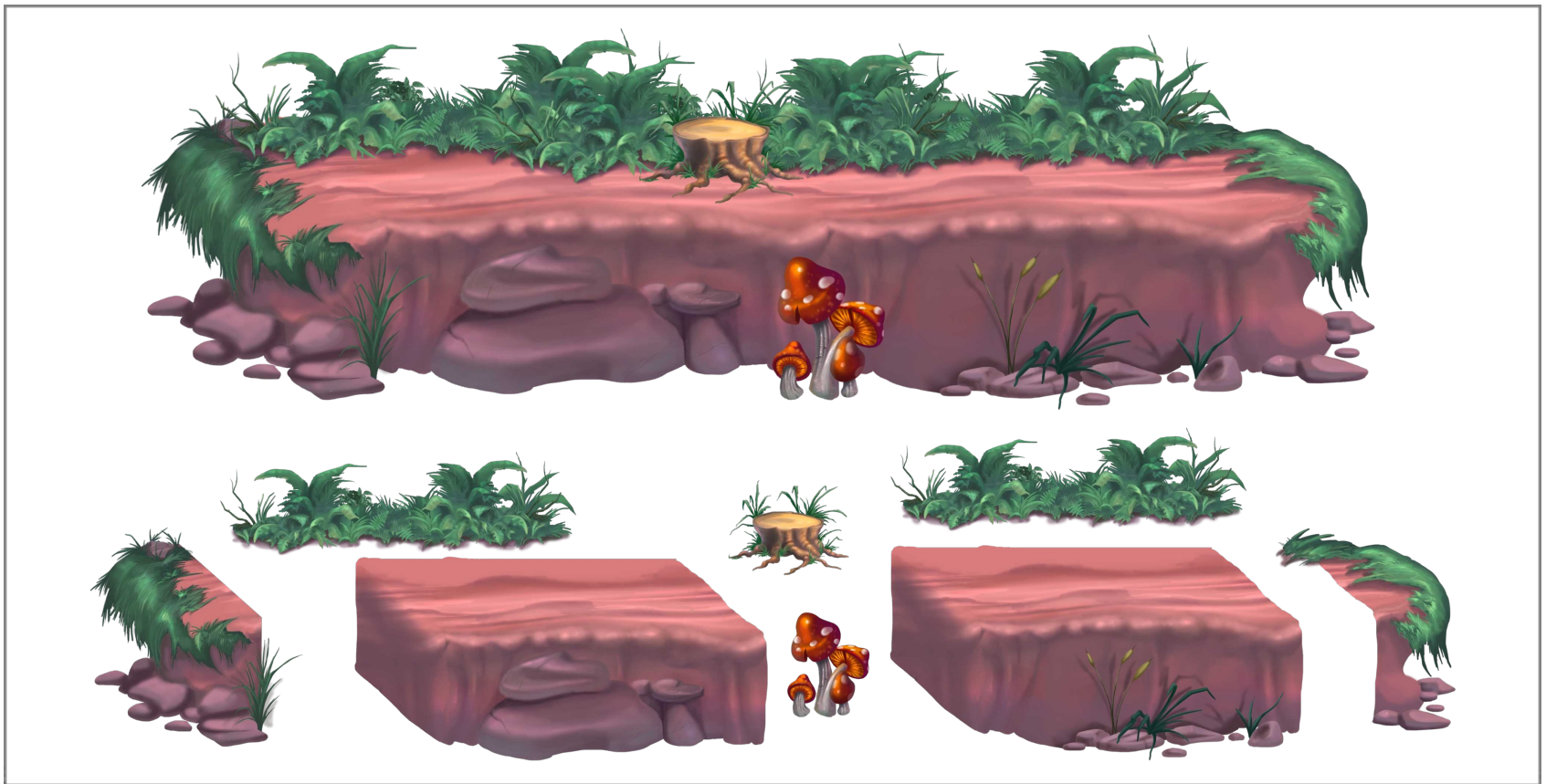
to make it. Starting with flat color I added a hi light. I blurred out the edge of the hi light to make it feel like it was moving around the vase to the toned side. I then added a simple tone to give some sense of dimension. This next step is optional. I cooled down the edges with a gray to make the vase feel like it had more volume and added a shadow to ground the asset. Always keep in mind when placing a hi light or tone on an object, that you are describing the shape and volume of the object based on where the light is hitting it. This will make the object more believable and give it volume.

The post was created using the same technique. Notice the hi-lights beside the cracks in the wood, and darker tones beside that. All are very small shifts in color. Also notice the gray on the left side of the post. This is actually a gray picked from the brown on the post, so if you color pick the colors as they travel from left to right on the post, you will see the subtile shift as we go from light to dark.



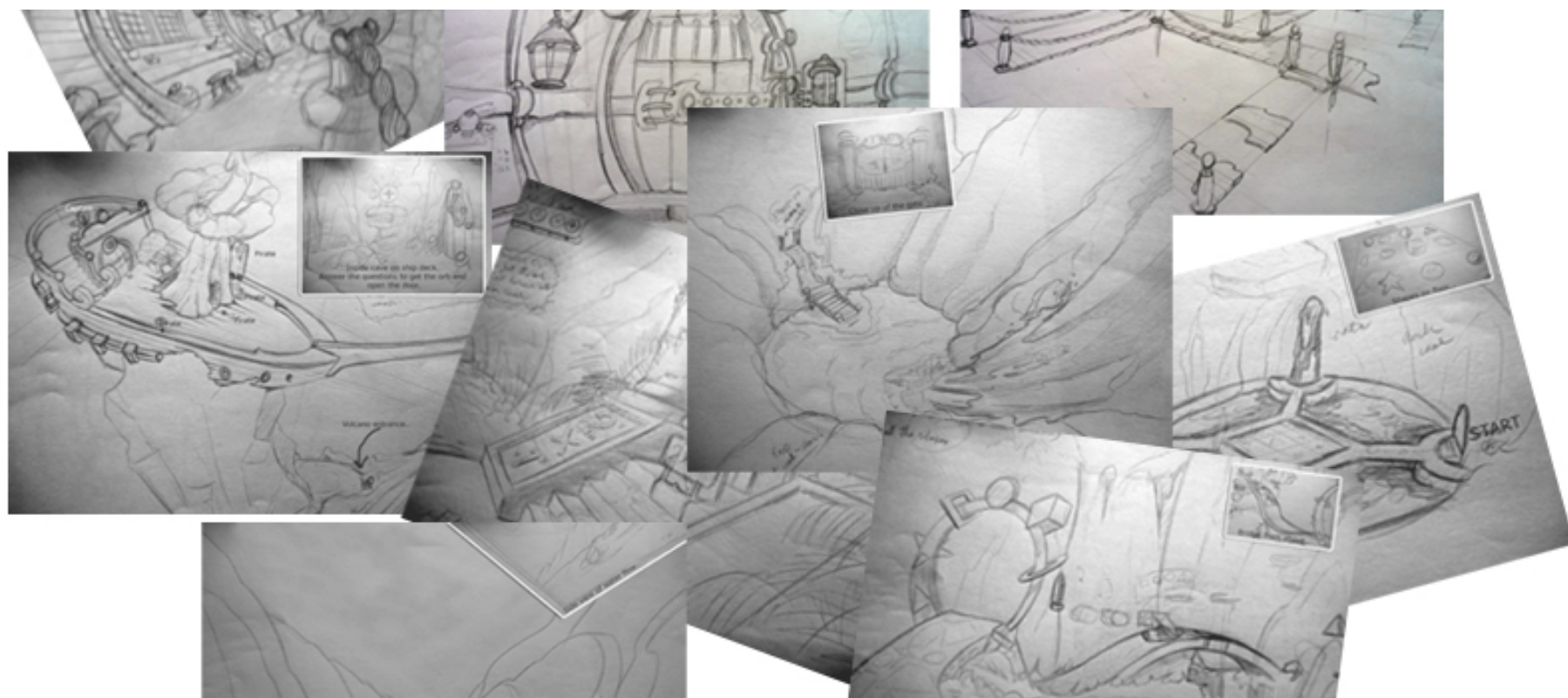
This walkway or track was carefully thought out in the pencil drawing before I went to paint. The tracks in the mud and the shapes on the edge of the track had to repeat. So I drew the left side first and randomized the centre to break up the pattern. I then copied the left side and flipped it to match and repeat. However the painting was very tricky and had to be carefully executed so that the edges where they meet were not seen. Below I show the track as one tiling piece, also the elements that make that up. I cooled of the rocks a little at the base of the track. I imagined that there might be water here and I wanted the track to be the centre of focus so this remained brighter. The track was also

built with the ability to become a small island on its own or an endless track simply by adding on the ends or leaving them out.



There are many ways to paint assets for games these are just a few tricks to getting some good results. Pick a style you like and break it down to its basic shapes and colors. Then build on that slowly by adding highlights, shadows, tones, gradients, reflective light etc It can be as complex or as simple as you wish. But now you have the know how to achieve a range of looks. Time to practice.





# 5

## Storyboards, Game Animatic

Storyboards are a great way to get an instant reaction and inspire discussion for a game. They can describe not only the environment and the camera angle but also the mood and feeling of your game. Allowing us to see how the game will progress and catch any areas that can be expanded upon, etc. Giving a great sense of where your game is going.

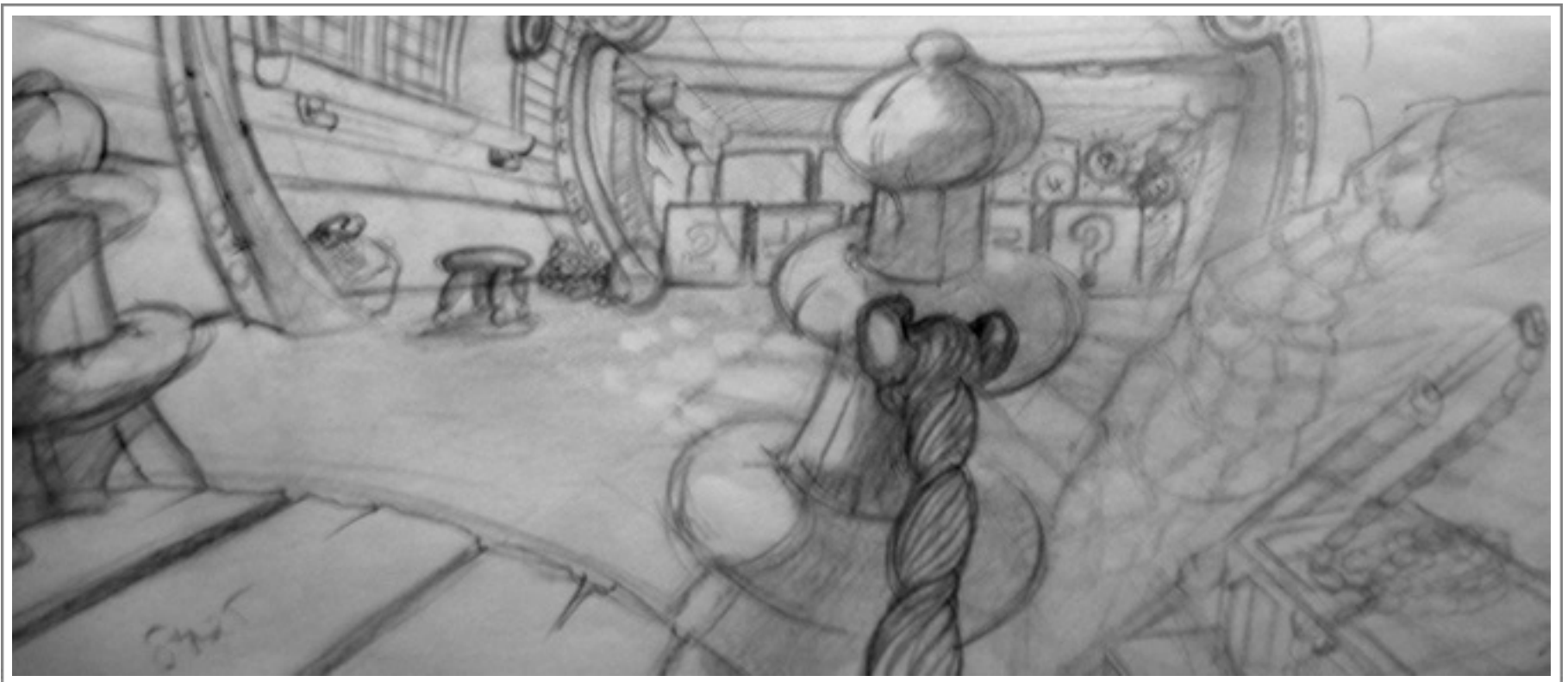
To create storyboards for a game we first need to have a story or an outline of what we are trying to achieve in words. Try to be as comprehensive as you can including the intro, title, logo, tutorial, etc this will go along way later to creating an asset list for your game. For now lets assume that you have a story laid out. Next we will create visuals that will express the story and its progression.

Before we start using our imagination and trying to express something from ourselves. Its best to look at what others have done first. Look at other games or art that you like the look and feel of. Get as much of this information around you as you can. Put color mood boards together and mix and match different styles and elements that you feel you

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want to express in your game. This is a very useful exercise. You will find new styles and looks, even cool ways for you to populate your environments that on your own you may not have thought of.

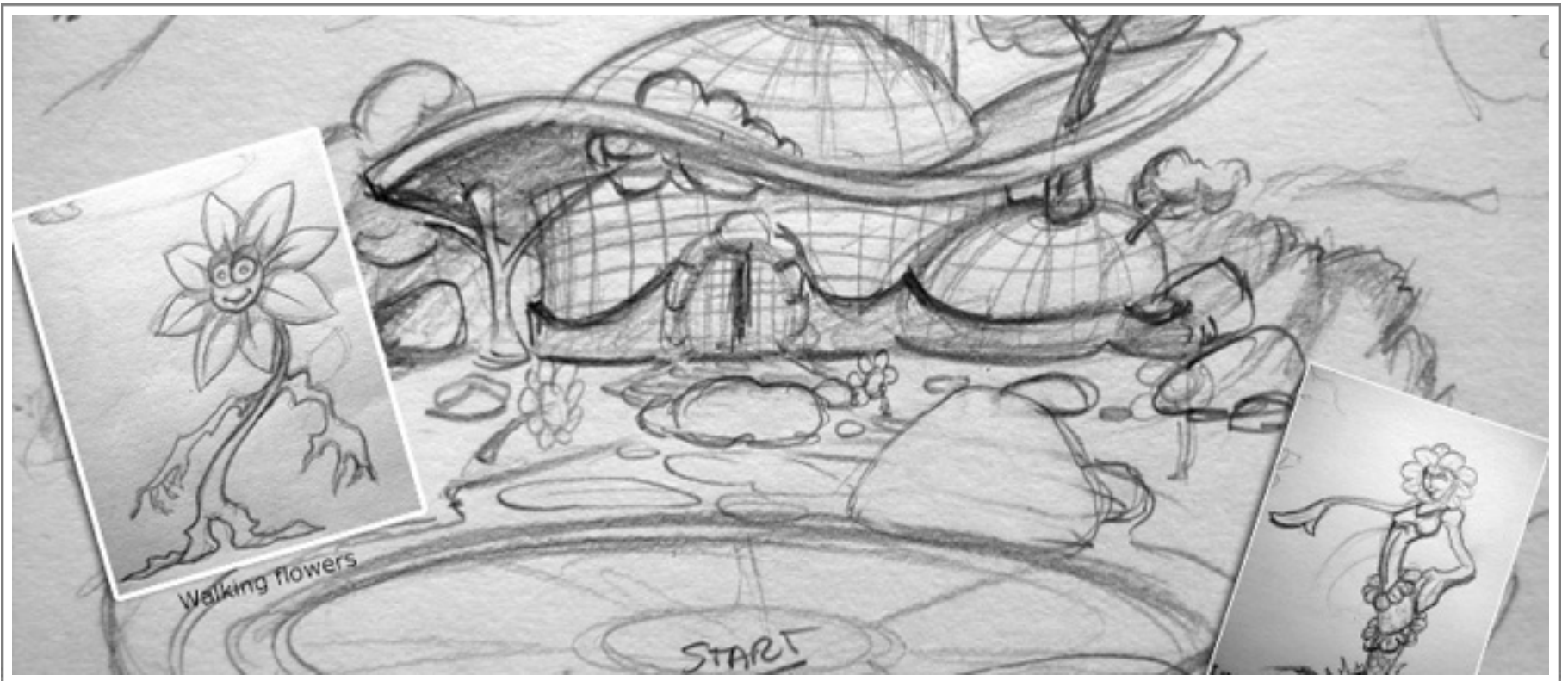
Storyboards are a pictorial representation of our words and mood boards, they will encompass all the information that we have been gathering. Our boards will give us a sense of walking through the game and help us build our level design later. For gaming I always draw my boards with the levels in mind. I don't try to explore the game angle, rather I aim to give the best angle that will explore the environment and open opportunities to add more to the game. Game boards are less focused on the character as they are in film or TV, as the player will control them in game. So its best to focus on the environment and where we will allow the character to go and what they will experience. In this first board I



wanted get a good view of the ship cabin the character will start in. I wanted to see how the light will be placed and what kind of props I might need to populate this environment. I was also focused on the style I might use and I wanted to see the wood and shapes that I could use. I redrew this from a few angles to explore the cabin, just some quick sketches and plan views to see where everything would sit. Eventually this area got split into four sections of game play, which were all conceived from this one exploration.

Storyboards also help you establish what you may require in each level. They will give you a feel for the game, and help to highlight problems before you get too far into the process. If you are looking for investment they are a great way to present your ideas.

Without storyboards you will be guessing and making mistakes as you develop your game. Your boards don't have to be the most complicated graphics, they can be schematics with words and arrows. In other words you don't have to be an artist, or the worlds greatest draughtsman. We are establishing what we will need in our levels, and how we will achieve this. So little thumb nails with text boxes underneath will be a great help. In the board below I knew I wanted to create a garden area that the charac-



ter could explore and eventually get into other areas. However I wanted an overview of what this place might look like. So I drew the outside of the green house. This board became the inspiration for the inner levels so it stood as a starting point with sub boards underneath. It even inspired me to sketch some characters as I explored the rocks, grass and plants that could live here.

Some elements we will get from our boards are.

Environments.

Splash screens.

Tutorial areas.

Cut Scenes.

Load level screens.

Logo Screen.

Props.

Where the character can go.

- What they will do.
- What can be interacted with.
- Where do you want the difficulty to be.
- Where will you hide those gems that must be found to get to the next level or lower the bridge?
- Character animations, (will they need to climb a rope, scale a wall.)
- Effects.
- UI.

Remember to reference back to the mood boards, and include this information in the storyboards as you draw them out.

Storyboards usually have a template that they follow so you know where in your story you are. I have created a template below that you can follow. When you are creating your template remember to consider the aspect ratio of your final delivery. It makes your boards more accurate as you start to flesh out your game. Nothing worse than having that part of your board cut out of your shot because the screen was not as wide as you would have liked. Production title and date are self explanatory. Sequence will be numbered either in multiples of fives or tens. This makes it easier for you to insert

Production Title	Date
Sequence/Scene	
<div></div>	
Dialogue	
Action	
Notes	

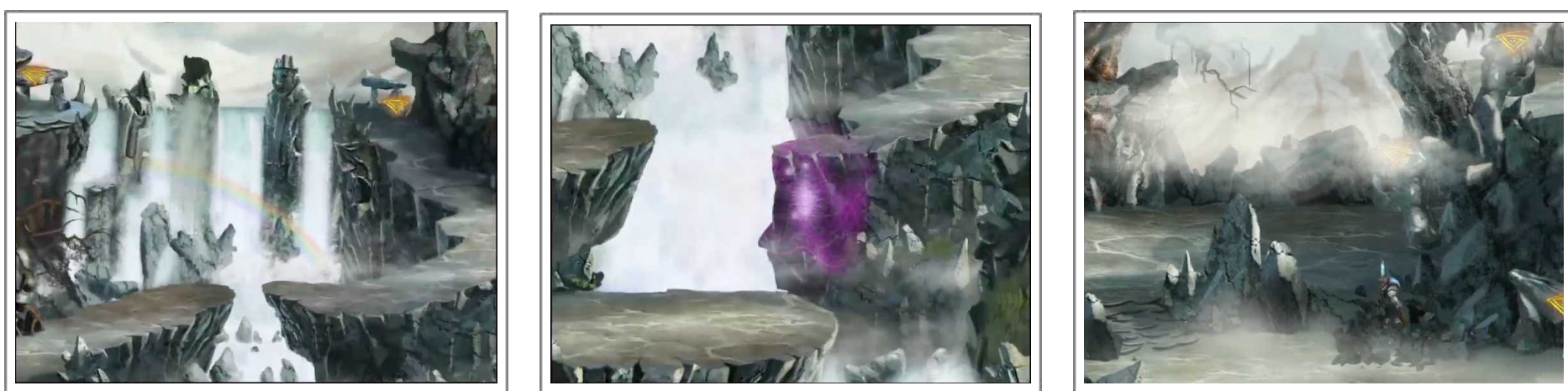


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extra boards etc as you develop out your ideas. Scene numbering will have the same method of numbering, however when you move to a new sequence the numbers will start again whereas sequence numbering will continue from 10 till 200 or where ever your game boards sequence stop. Dialogue is where you will paste in any character speech or sounds that are important to the scene. In the Action section I would put in as much detail about the on screen action and animation, describe where the character will interact or fight, etc. I always include additional notes for effects or how you want the scene to move from one scene to another with dissolve or fade, etc.

When you have your game storyboarded, it helps to create an animatic of the flow of your levels. This will give you a good idea of how it will look and work when in game. Also if you have opted to buy assets instead of building them yourself, you could start to tile them out in your boards and build out your levels exploring how the game will play out.

Create a movie, where the camera tracks through your scene. Up and down paths over bridges, etc. If you do this as you are creating your assets it will help you puzzle out the problem areas, and show you where you may need to put in assets that have more variety. Its sometimes hard to visualize the requirements till you start laying out your created assets. You will find that you may need a certain platform to get the character around the level, or stairs at an angle you never thought of. Trust me this is a very helpful way of teasing out any potentially difficult areas.



There are many software applications out there to achieve this task, I use After Effects as its my preferred tool. Its easy to learn has all the attributes of the adobe applications, so if you are familiar with photoshop your learning curve will be lessened. If you don't have After Effects don't worry, you can most likely do the same within your game

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engine. Using After Effects is a faster option and requires no scripting of cameras, etc.

The first thing to do is set up your camera to the same aspect ratio you will use in your game. We want to get the look as close to the game play as we can so there are no surprises later. If you have key poses of your characters use these to show where the character will be as we move through the animatic.

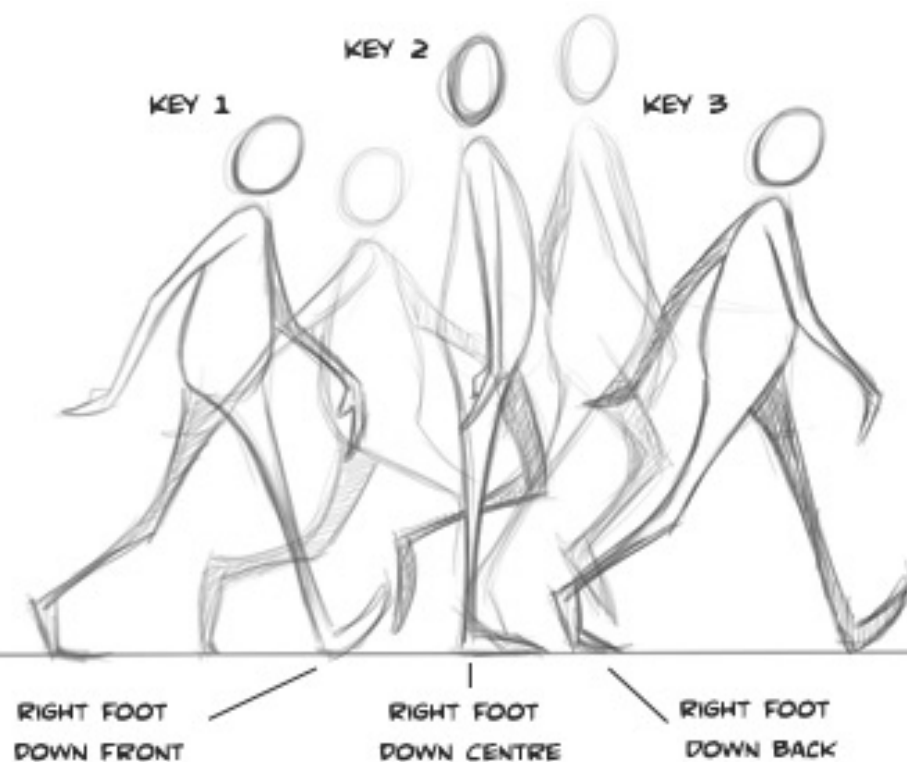
I usually create this animatic at two stages. When I have completed the line drawings and when the color is done. Both always show me areas I could improve on, and make more interesting or that could use more work.

Import all your boards, characters, effects, ui, logo, etc. If you have any animated assets like draw bridges moving platforms, animate them to show how they will work in game.

Indicate areas of triggers and effects. This is a great way to see if you have too much or too little going on and in what areas. Animate your camera, and see how it plays out. In this way you can quickly move effects around to get the balance you are after. This process gives you the ability to quickly pick assets and move them around to put in stairs or doors etc and play it back instantly to see the changes you have made.

When you are happy with the results, render out a movie. These movies can be great for showing potential investors or using as trailers to gain interest in your project.

Swap out the pencil for the color in After Effects and repeat the process as you develop your project. This will help to fine tune your game and you may see areas that you could improve, or areas you may want to get rid of. Either way the process becomes quick for you to edit and view back instantly. Again, render out a movie to show off your work.



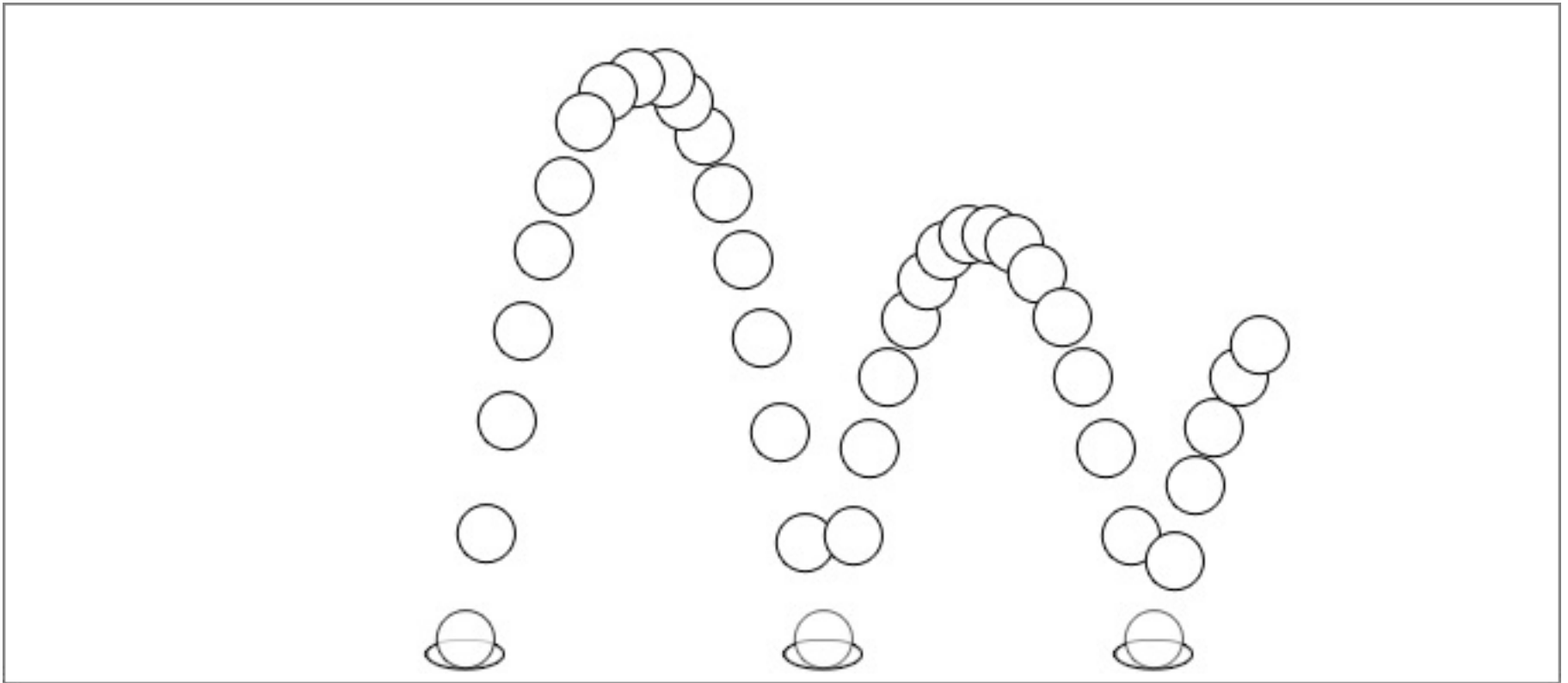
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# 6

## Animation and Motion

Animation, “..the state of being full of life or vigor; liveliness”. This is the dictionary explanation of animation. When we move an object from place “a” to place “b” and play back the frames this is motion. Animation in the classical sense gives character, life and vigor to a drawing. Breathing in personality and involvement in the environment its in, and commitment to its goal or purpose.

Lets take a look at the age old bouncing ball. If you have even tipped your toe into animation you will have heard about the bouncing ball. This is a good simple example of timing. Because its all in the timing. Where the ball leaves the ground the spacing between the balls are further apart and as the ball reaches the top of the arc they are closer together because the ball starts to slow, and again as the ball starts to fall the spacings become further apart. The reason for this is simple, the further apart the balls are the faster the ball is traveling, and the closer they are together the slower the ball is traveling. So the distance the drawings are from each other changes the timing of the animation. This



is very important to understand, as it changes motion to animation. Speeding and slowing the ball to mimic forces on the ball allow us to understand it. What is the ball made of, is it a balloon that floats as it bounces. In which case we would need more frames closer together to get the slower pace. Maybe the ball is hard like a baseball that travels much faster, where the spacing is further apart. So simply put the timing is in the spacing, and the playback rate of your scene will effect this.

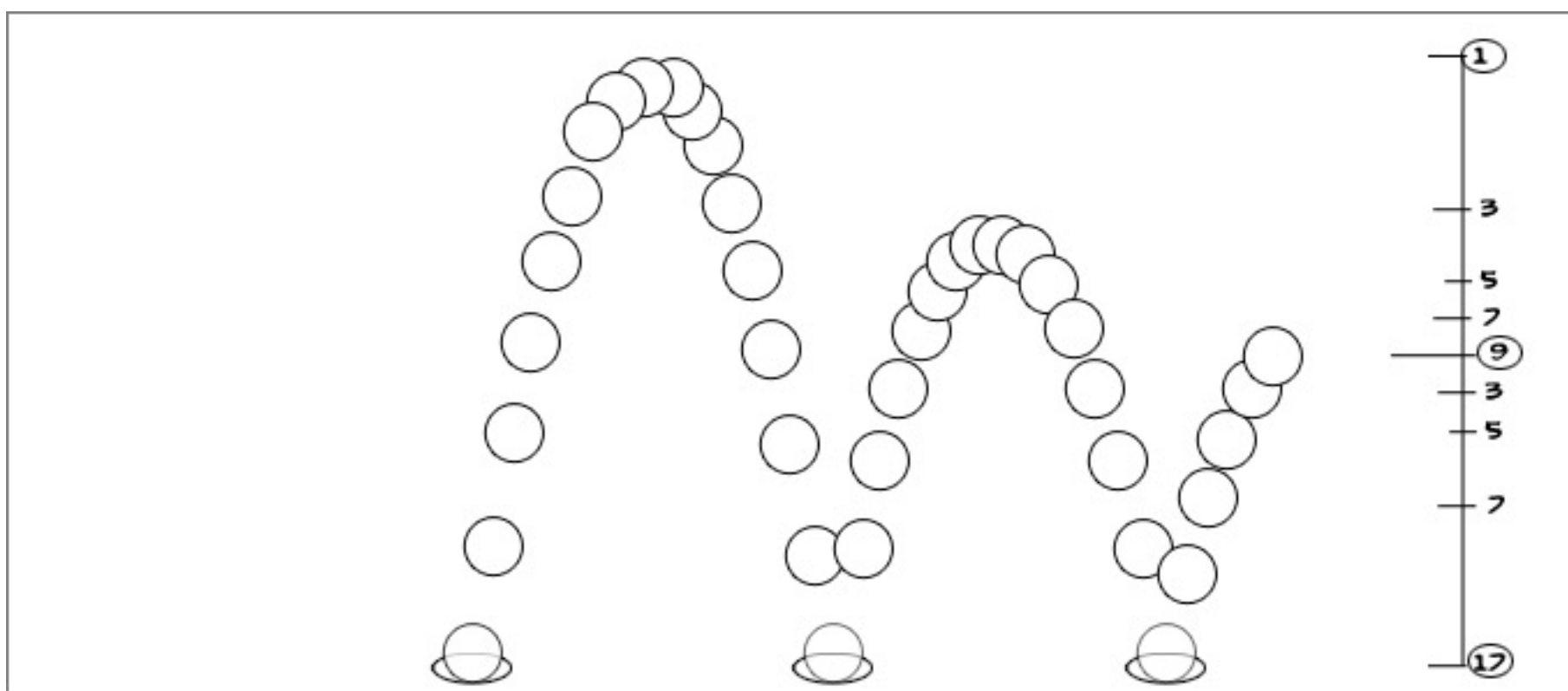
When you start to animate its a good idea to get reference, not only for timing but for how an asset reacts to forces put on it. The most obvious force we deal with day to day is gravity. This is what makes the ball fall. However gravity, Kinetic energy the material of the ball, and the surface it impacts with will effect the balls upward force. So how we animate the ball will tell us all these things about it. Find something that is close to what you are trying to animate, whether its a character walking, a splash or a falling leaf, get reference, know what the ball is made of where it is what forces are being applied, etc.

Lets take a look at how fast your frames will play at and how this effects your animation. Film plays at 24 frames per second. For the most part animation was done on 2's, that is one drawing for every two frames of film. Unless there was a pan, which means moving the camera from left to right or visa versa. Where it was animated on ones, there are other reasons an asset might be animated on ones for timing. With the introduction of new technology play back speed is now optional. Games can now play at 30 to 60 frames per second and more, largely due to the refresh rates of the screens. However 30 frames per second is more manageable and consistent and eliminates some of the strobing effect.



Strobing happens mostly when the animation has no motion blur, where the image is clear to the eye it appears to have a jerky movement, on film at 24 fps there is a blur. Most games can run at the higher rates but have areas that get too heavy and the frame rates start to drop off. So it's better to run at 30 frames per second and be consistent.

Take a look at the final output devices for your game, what's the min/max that the device can playback at. Test how many frames per second your final device will tolerate and keep in mind how many other characters will be on screen, including effects, background, etc. 2D can be coded to play the animation at a specific speed, while the game runs faster, so test what looks good to the eye. I would recommend using 24 fps, if you want to drop frames or add some later you can, plus you won't be too far off.



The reason I took a little time to explain this is because I wanted to demonstrate timing charts. When you are animating it is very rare that the motion of the asset will be consistent. Animators create “keys” or extremes, that is a drawing that describes the beginning of a movement and the end of a movement. The animator may have many extremes in his scene depending on the animation involved. For instance the ball animation on one bounce may have 3 keys, one for the ball on the floor, one for the ball at the top of the arc and one where it hits the floor again. The keys describe the animation at the extreme. So how would the animator map out the placement of the in-between drawings. This is done by creating charts. Above is a suggestion of the bouncing ball chart for the in-betweens. This shows the frame starting at one, the mid point being nine and the final drawing at sev-

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enteen. The first breakdown will be at five, however notice the position of five is not directly between one and nine, it is closer to nine. So this is where the artist will draw that ball. This gives us control over the animation timing and allows the animator to keep animating, knowing that the timing that is in the chart will be translated to the scene animation.

It is possible to have timing charts for different parts of an animation. A character with swinging arms will have timing charts to describe the slow in and slow out on either side of the arc as his arms swing. Maybe his legs work at a different time to his arms so they will need a chart to describe the timing and spacing.

Understanding this simple concept will help you when working with motion graphic applications, where the frames are interpolated by the software. Creating more frames at the start of a motion and then spreading them apart will give them a sense of speeding up from a slow, or a slow in. In some applications it will be necessary to key this process, not having the curves that pack the frames to one side or the other to allow for the timing.

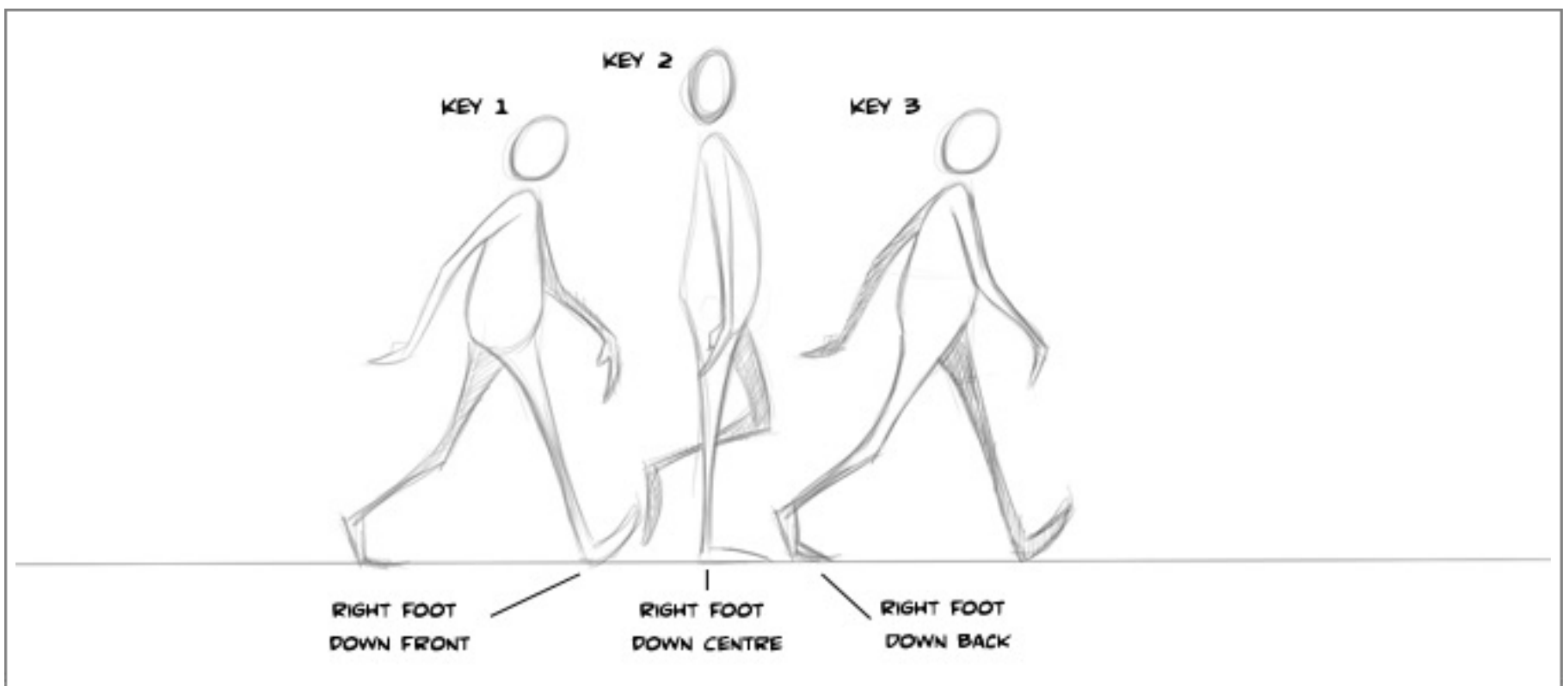
There are many different areas in animation, character, effects, environment, interactive UI's the list is ongoing. However if the basic principles of animation are applied then the simplest of asset animation can become very entertaining. Once we have the drawing and timing understood there are techniques that can be added to give more personality, liveliness and vigor.

However its necessary to know the process of animating. Its not practical or possible in some cases to lay down final drawings and animate it that way. We must start with rough drawings that are simple representations of our asset. Then slowly build on that going over our animation multiple times before we have it at a final version. Testing all the time as we go so that the animation is working and paced out the way we want.

I mentioned earlier that we use different techniques in animation to give more character or life to the asset. One of which is squash and stretch. Its that bounciness we get when the ball hits the ground. Where it flattens out on impact and then stretches out as it starts to move away from the ground. If you take a kitchen sponge and squash it flat and then stretch it out this is the basic principal. So where is it used? If a character is overly round and joyful you could give him a bounce as he plants his feet on the ground letting him squash, and stretch him out as his weight is lifted away from the surface. In a GUI where

the user has touched or clicked the screen. On touch the graphic could squash under the touch or click and then stretch as it is let go and even bounce. The uses are unlimited, however it gives a personality type to the asset and this is where the balance is needed. Do you want the asset to be bouncy and springy or is it more serious and defined. The amount of squash and stretch you use effects how the user perceives the animation, making them think that it is very cartoony , happy, sad, joyous, etc. The key is timing and the amount of the squash and stretch technique you use.

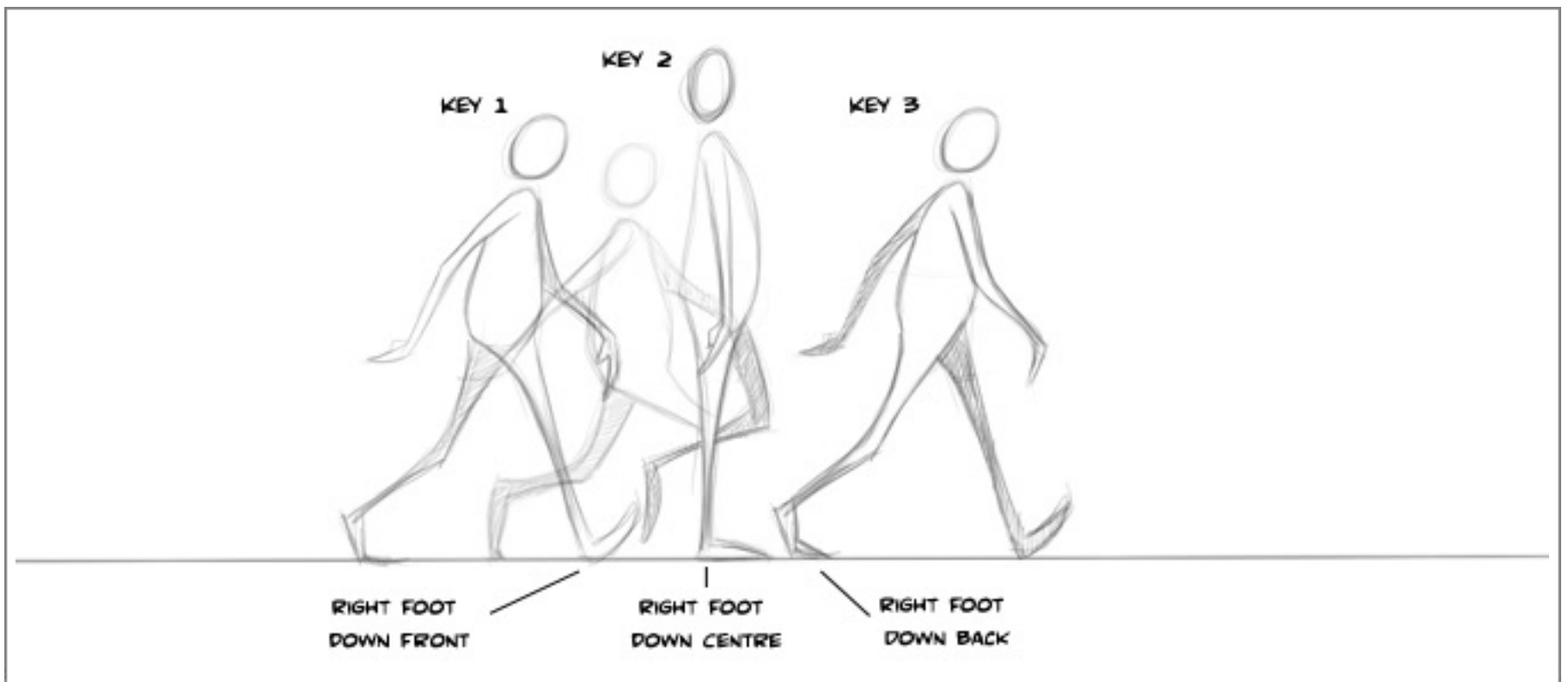
Creating a walk or run cycle for your character can be very daunting, no matter if you are using stop motion, stick figures or you have the art skills required to draw great characters for your games. However we can break it down into some simple steps.



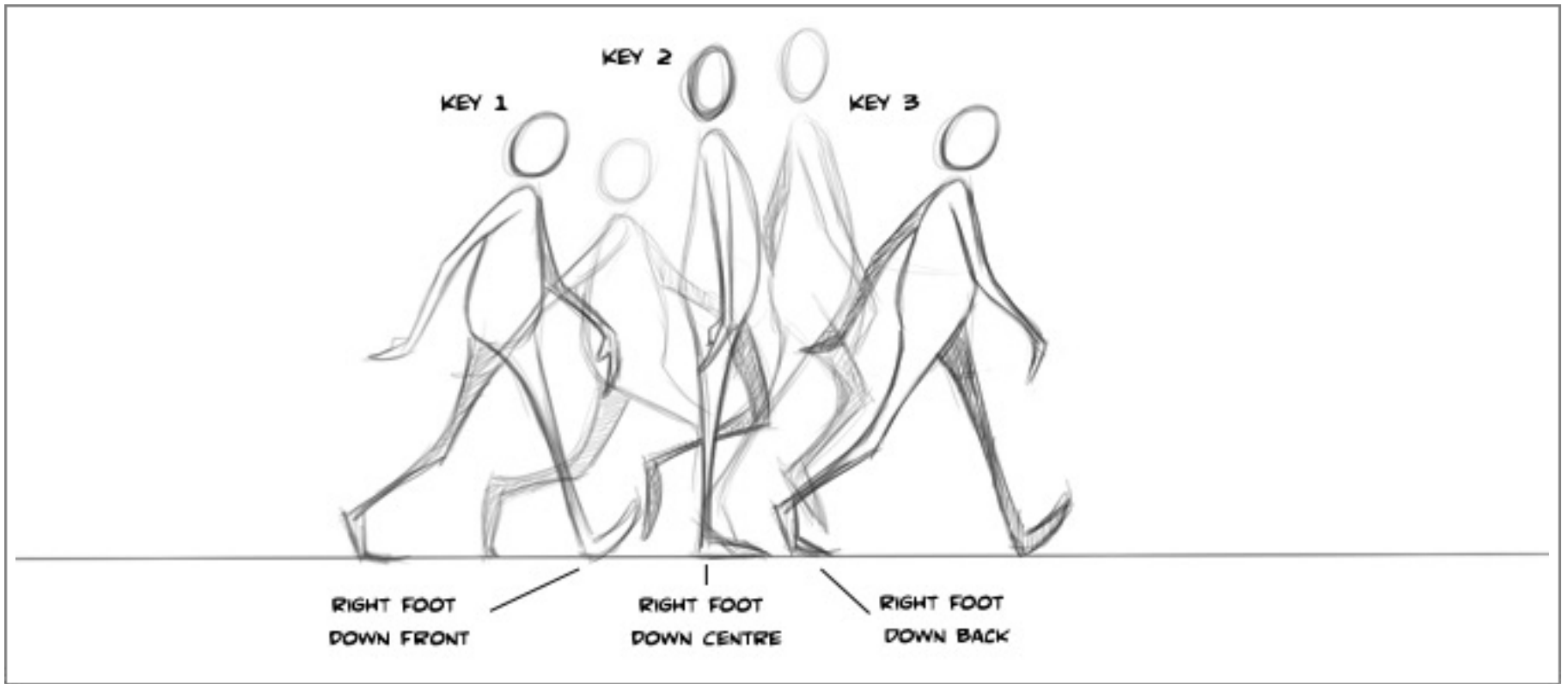
My first key is always with my characters legs wide, taking his first step.

Second, is where he has raised his knee up to its full height and getting ready to descend. Third is the opposite of the first drawing, where his foot is down matching the opposite pose of the first drawing.

There are a few things going on here. I am creating keys like I did when I animated the bouncing ball. Extreme poses. These will be in-between'ed to get the full walk cycle. On the middle key the character raises his height because he is pushing up so his head will be higher than the other two drawings. There will also be a drawing where the character goes down between these drawings. This is where the knee gets bent so he sinks. Also on the other side the character reaches a full stretch to the tip of its toes. Keep in mind the

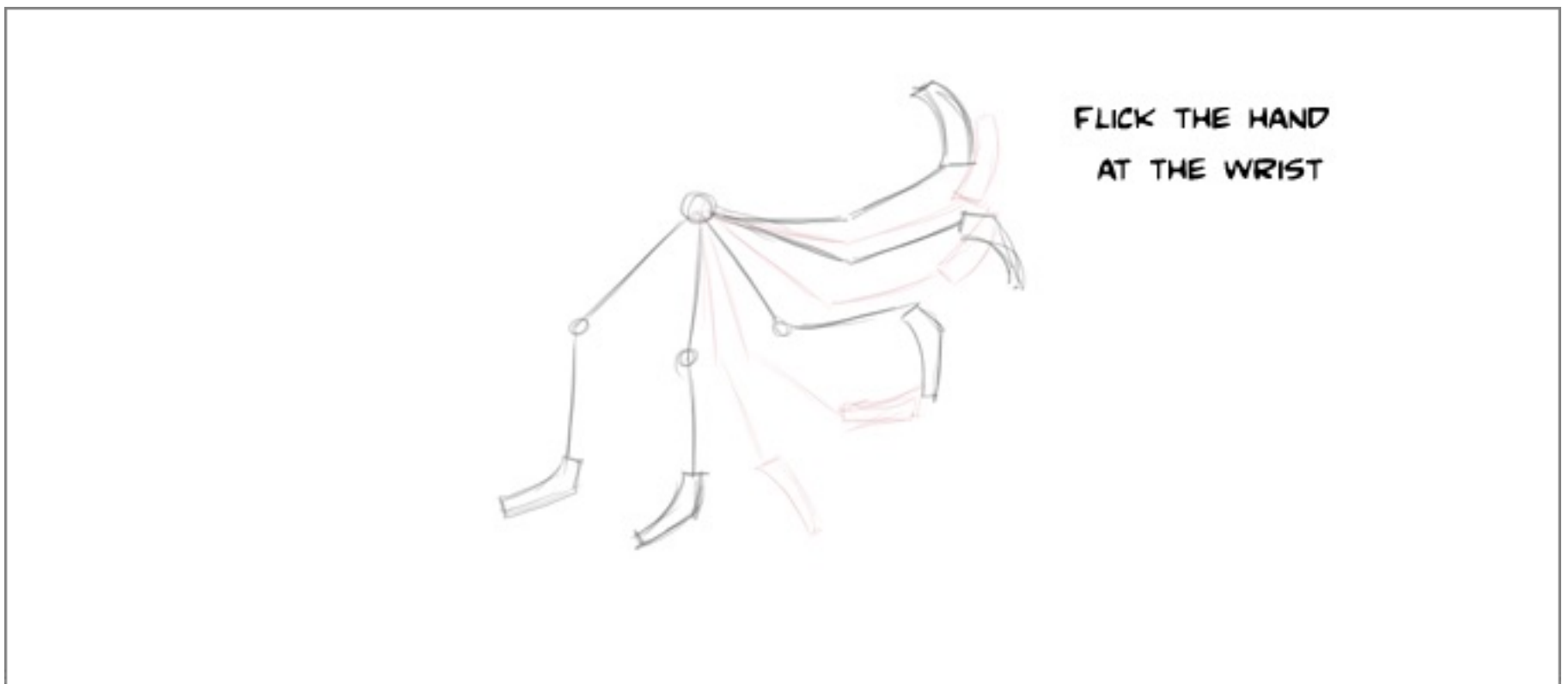


amount of up and down and spacing you use effects the personality of the character. Swinging his arms and how high he swings, how much he bends at the elbow, how much he bounces, etc. All effect the animation, so its wise to do rough drawings and test as you animate. We can add more to the character by swinging the hands and adding drag to his feet,



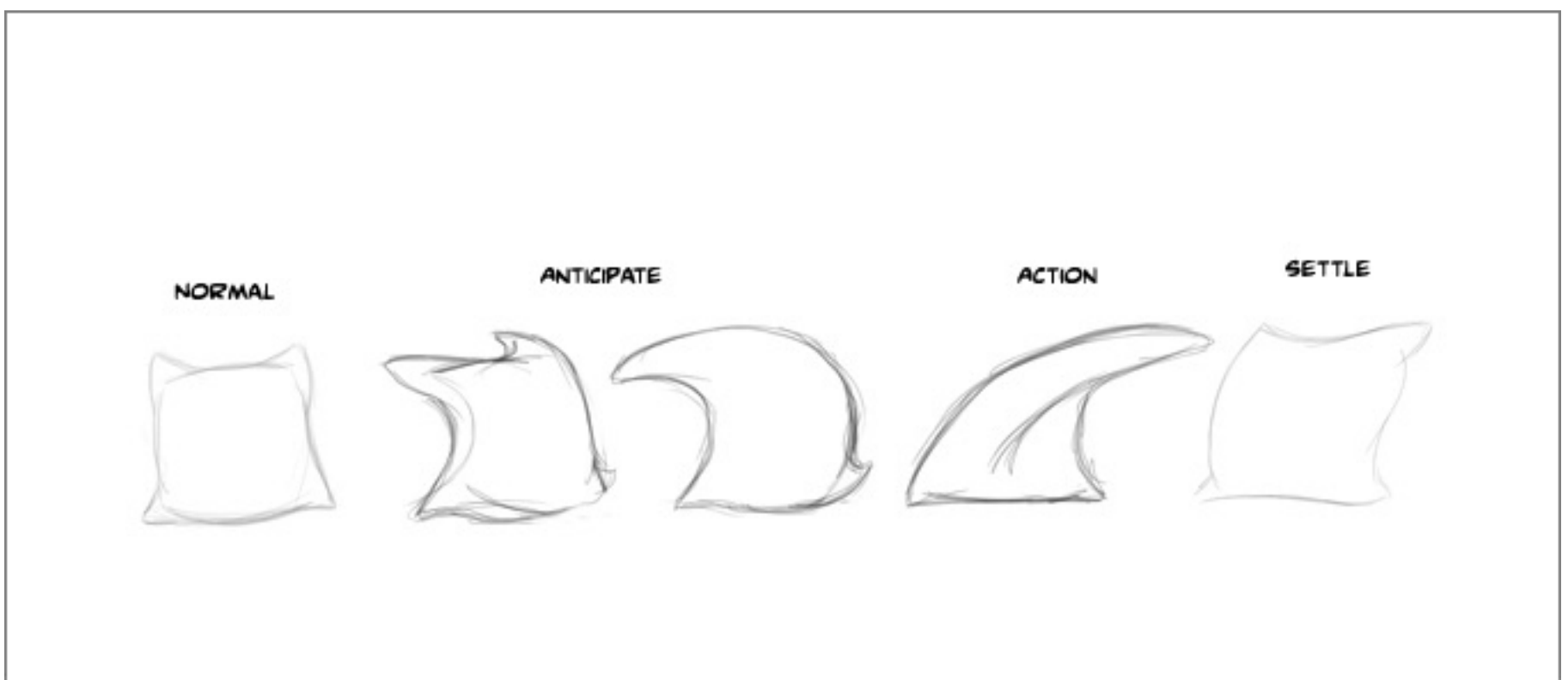
this is follow through and overlapping action. Imagine a dog swinging his tail back and forth there is a drag as the tail swishes back and forth. We can do this at the wrist. As the hand moves to the top of its arc, as it starts to fall, arc the hand at the wrist. Small additions to the character like this or any asset animation can add a real sense of fluidity and refinement to the animations. Making them more professional looking. Start out with sim-





ple circles and squares to get the feel of your animation, don't try to put everything in there all at once. Animate the arm swing as sticks. Go back in and animate the overlapping action on the hand. Go back and add some volume to the arm and hand. Go back and add some detail. Go back and add more detail, and while doing this don't forget to test your animation changing the spacing of the in-betweens adding more squash and stretch or less, etc. Till you have an animation you are happy with.

Anticipation is a very useful trick to tell the viewer that we are going to do something. Then do it. Then let the viewer see that its done. It gives the player time to register each



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step of the process and enjoy it. However remember its all in the timing. This simple sack is an example of anticipation. This could be a menu item or a platform that moves from left to right and back. By adding in the anticipation you allow the player time to take in whats going to happen and maybe step onto the platform, etc. Animation is about visual communication, Charlie Chaplin told some great stories and entertained audiences world wide with just his actions. So if its just a simple menu item or main character, or if your main character is a simple box, employing the principles of animation is necessary to some degree to communicate to your player whats about to happen or what they should do next.

There are twelve principals of animation that were written about by Ollie Johnston and Frank Thomas in “the illusion of life”, these principals were used to create character animation for classically animated films. 2D game animation has some limitations when it comes to implementing these principals. However I will list them here and explain each so that they are covered.

So far I mentioned Timing, Slow in slow out, Squash and stretch, Overlapping action, Anticipation the other are as follows

### Staging

Presenting an idea so that there is no doubt as to what you are showing, if its a facial expression make it clear that the character is happy, sad, annoyed etc

### Straight ahead and pose to pose

Straight ahead animation refers to animating without keys, animating each frame one after the other. Pose to pose is animating using keys.

### Arcs

Most animations follow an arch, like the hand swinging, there should be a clean arc as the hand swings from pose to pose. Like a pendulum of a clock swings you can trace an arc as it swings.

### Secondary action

An additional action to the main action, like a character walking and his hat bounces from his head as he dose so.

### Exaggeration

Pushing a drawing further than reality would normally allow.

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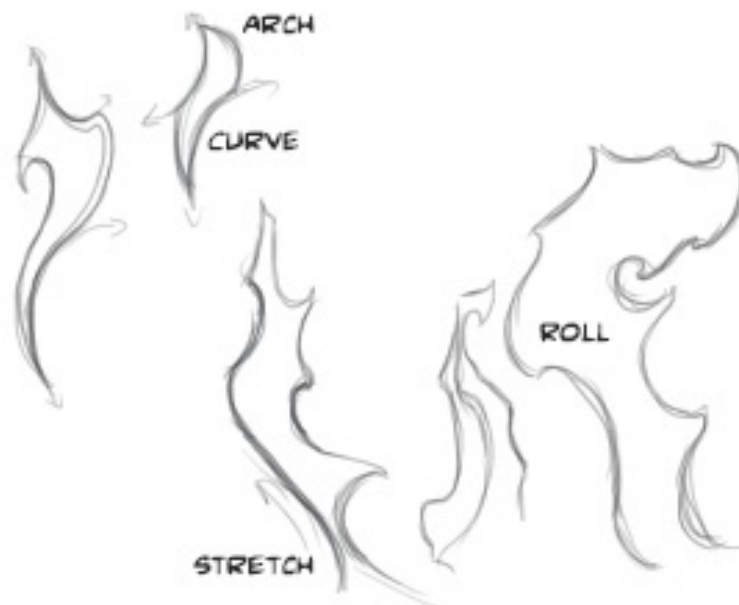
## Solid Drawing

Making sure that your drawing is in the correct perspective, and has volume and weight

## Appeal

That the drawing is pleasant to look at and has likability.

There are many points of reference that you can use on the internet, so always get reference and use it. Don't try to do the drawing in full, break it down into simple shapes. Then keep going back and adding to that shape with more detail. Keep testing the animation as you do this correcting problem areas as you go. Play with the spacing of the drawings for timing. Finally, watch your volumes that as you animate they don't grow or shrink unless its what you had intended.



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# 7

## Effects

Special effects play a big part in your game so don't try to fudge this section. One explosion is not the same as another. When creating any artwork for your game you must always consider the style you are aiming for and keep consistent to that style. If you get the balance right between your Characters, Backgrounds, Special effects and GUI you are in a good place. EFX can be created in a number of ways for your game.

**3D Animated effects**, using a package such as Maya, Blender or 3d Max etc can be used to create water, explosions, magic and more. They can then be rendered out as frames for use in your 2D game.

**After Effects** can be used to create some stunning effects such as orbs, waterfalls, smoke, explosions etc and again rendered out as 2D sprites for your game.

**Traditionally hand drawn** animated effects can be created in Photoshop, Flash or any animation package you



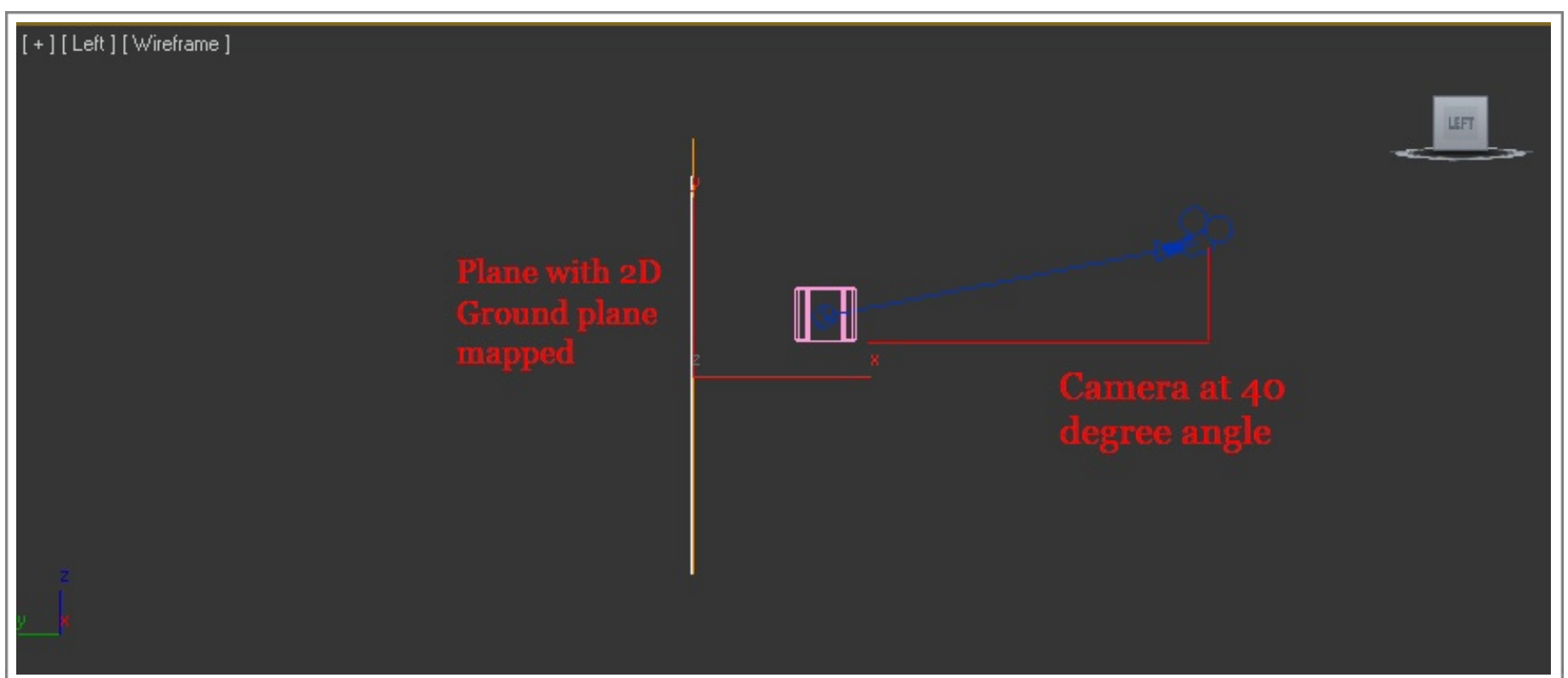
may have to hand. This requires some animation experience, but can yield some effective looking styles.

The game engine you are using most likely has a particle generation plugin. I have always found these to be a little difficult to control, but they are always improving on this. Unity 3d has a great set up for creating effects and worth a look. Just keep in mind the learning curve involved in all of these packages. Also it is difficult to keep the style of the game, as many of these effects are generic.

### 3D Animated effects

I use 3D max to create all my 3d assets, but the process in any 3D package is very similar. I have found one draw back in using 3D for rendered 2D effects. If you want your effect to repeat or loop, you will have a problem with the looping of the animation. For instance if there is a waterfall or flame its very hard to find a nice smooth loop. On the plus side 3D can produce some really good effects that don't stay on the screen like a smoke puff or dust that dissipates. Another good use is crumbling statues or ground planes that fall away, boxes that collapse, etc. Because they can be textured to look like your 2D they will blend well with your game style.

To correctly render the effects you create in 3D, it is important to set up your camera to match the game view or angle that you have chosen to use. In chapter two I used a 40 degree angle, so I will show you how to do this in 3D.



For this example I will create a box that will be a representation of your asset, which could be a particle system or exploding box whatever you would require. So I have created a box of equal proportions in the top view port.

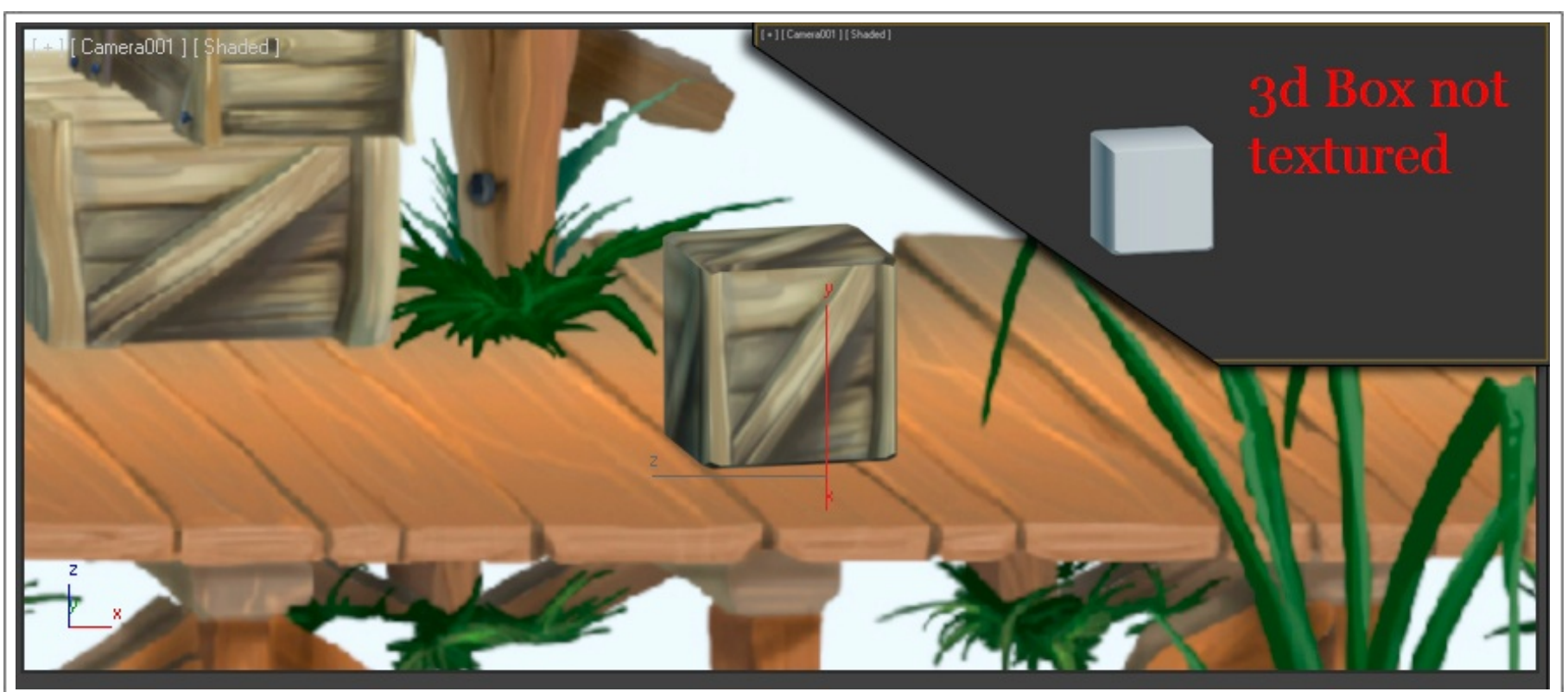
Create a targeted camera and focus the target to the centre of the box by using front left and top view ports to align. Make sure it lines up straight on with your box and is not at a three quarter angle.

In the Z axis dialogue box set the Z coordinates to 40 or drag your camera up in the side view till its reading 40.

Set your lenses to 35 mm, usually a good standard to start with and should give you a good view of your object. This is your choice though, so choose one that works for you.

If at this point you want a side on view of your box rotate the box and not the camera. Keep your camera in this position as its the easiest way to keep your scene and camera at 40 degrees.

Because I am using a box and it must sit on a ground plane in my level, and I am using orthographic projection. Its a good idea to set your 3D camera to orthographic projection also. This will make it easier to match the 3D to the 2D.



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Now create a plane in the front view port and map the ground plane of your 2D asset onto it. This will allow you to see how it will look in game and adjust the asset to fit into the scene.

I have roughly textured the box to show you how it can fit. Also you don't have to worry about poly count as the box will be rendered out as a sprite, so you can put as much detail in there to match with your game as needed.

So if you want to blow up your box or collapse it you are good to go. The only other consideration is to keep the animation in frame, then render it out as .png sequence or whatever your preferred file format is. Max also gives you the option to render the Alpha map should you need this. Its under render setup - Render elements - add, and choose Alpha. Using 3D in this way works very well for props like pots breaking, planks collapsing and the list is endless so go get creative.

I have also used this technique for characters as well, creating high end 3d characters and animation, and rendering there animations out for 2D game play. Its a good looking cheat and will have people guessing if its 2D or 3D. The same goes for the environments if you like to build in 3d and want a 2D version.

## **After Effects**

After Effects is a great program to create magical glows blasts, etc. The particle system in AF is quite good and with tweaking you can come up with some very cool looks. There are many really good tutorials online to help you achieve your goals. Rendering from AF is very fast and simple to get the hang of, plus once you have created an effect you can change colors, sizes, transparency, etc on the fly and build up a quality library for future use.

## **Hand Drawn Effects**

If you have good drawing skills you maybe able to get some great looking effects this way, especially considering that game effects require very few frames. What I really like about this way of creating effects is the control it gives you. Loops are easier to achieve, you can style the look and feel to suite your game and take away that generic realistic look most other methods give you. Also remember that none of these ways of creating effects are exclusive of each other. They can be mixed and matched to get the right look for your game. I use Photoshop, TVP animation, Toon Boom or you can use flash to animate and if you

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really feel like going old school, you can use pencil and paper.

The real trick to animating anything is reference. Oh and more reference! Observe natural phenomenon in the real world. Observing physics and its effect on real world objects. Understanding that water, as an example, is not one great big object, its an enumerable amount of molecules that act in a certain way when put in certain conditions. This is true of every object. Its not necessary to know the make up of every element, but to understand how an object reacts and moves when forces are put on it. What better way to have this knowledge than reference.

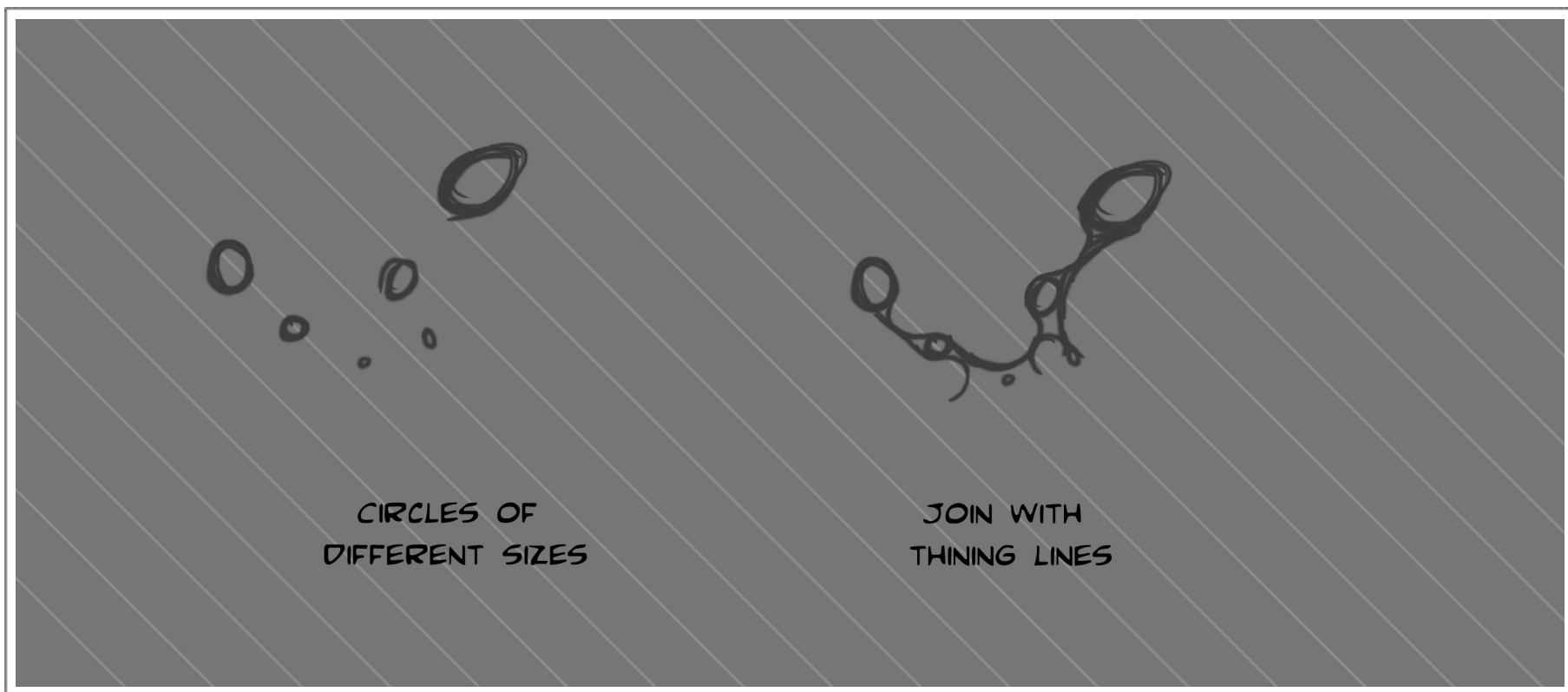
2D Game based effects use a limited number of frames, and games running on different devices run at different frame rates. So its useful to know what frame rate you are aiming for in your game. I use Photoshop for effects animation, as I do mostly mobile games. Photoshop has a timeline that you can use to do frame by frame animation. Go to Window - Timeline, and it will open at the bottom of the screen like a film strip. Just under the image there is a frames per second setting which will have to be set before you start your animation otherwise your timing will be off. If your game runs at 24 FPS (*frames per second*) this setting will be .03, if it runs at 15 FPS set it to .07. These are approximate numbers and can be adjusted as you animate, but they will give you a good guide. Test the rough animation in your game engine to see if its playing back correctly.

Photoshop can import video into the timeline, which then can be used as reference to animate your effect. A bit like rotoscoping. You wont need all the frames but the key ones that express the best of the motion you are looking for. Also you will want to exaggerate the look and motion so don't follow it too closely or your animation will look to stagnant.

There's a lot to know about animation before picking up your pencil and starting to draw. In the previous chapter i went over this Timing, squash and stretch, anticipation etc You can get more information online or in other books dedicated to animation exclusively. Here I am showing you techniques of how to draw effects and understand how they are constructed. The timing and detail will be dictated by the amount of frames you have to use and the allowance your engine will have for these effects.

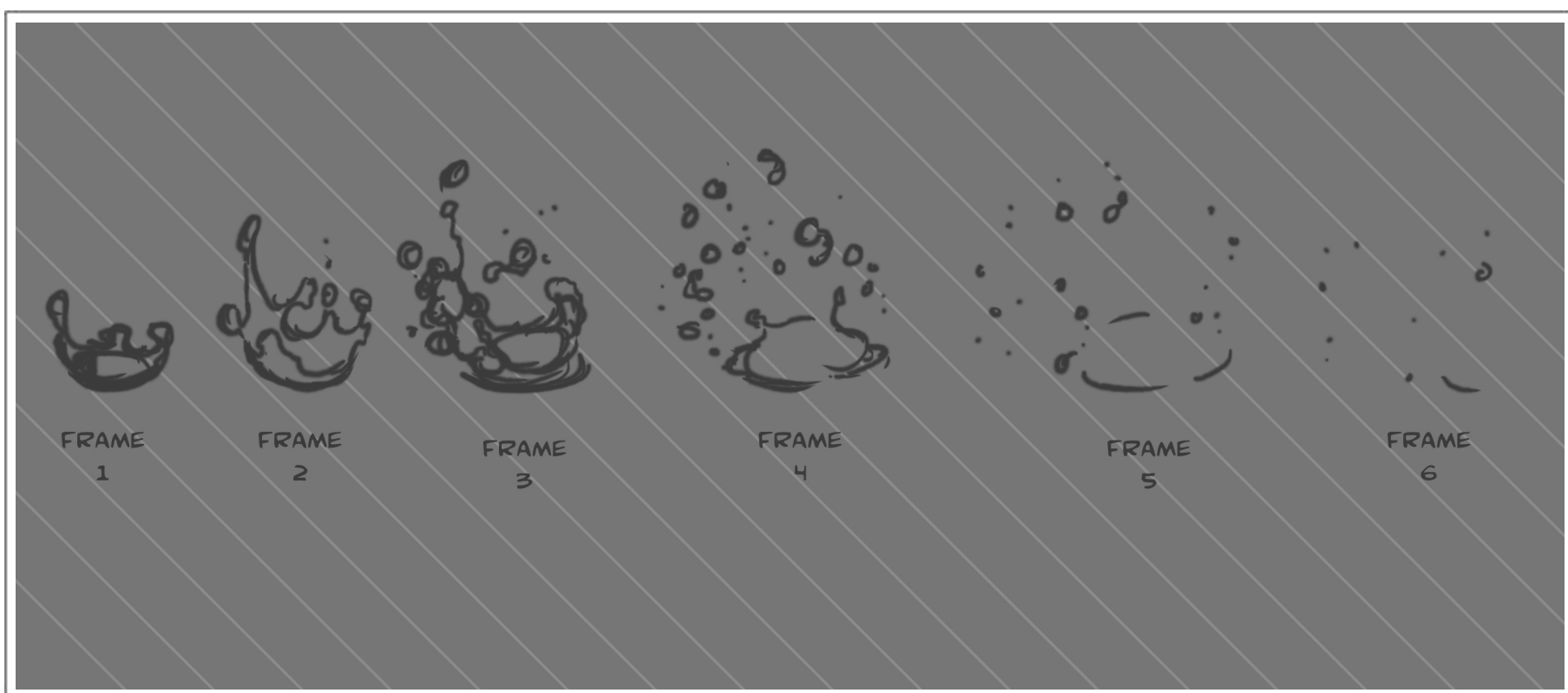
Here are some simple ways to create 2d hand drawn effects for your games. Lets start with water. Maybe your character is splashing through some puddles or falling into a river etc





## ***Water***

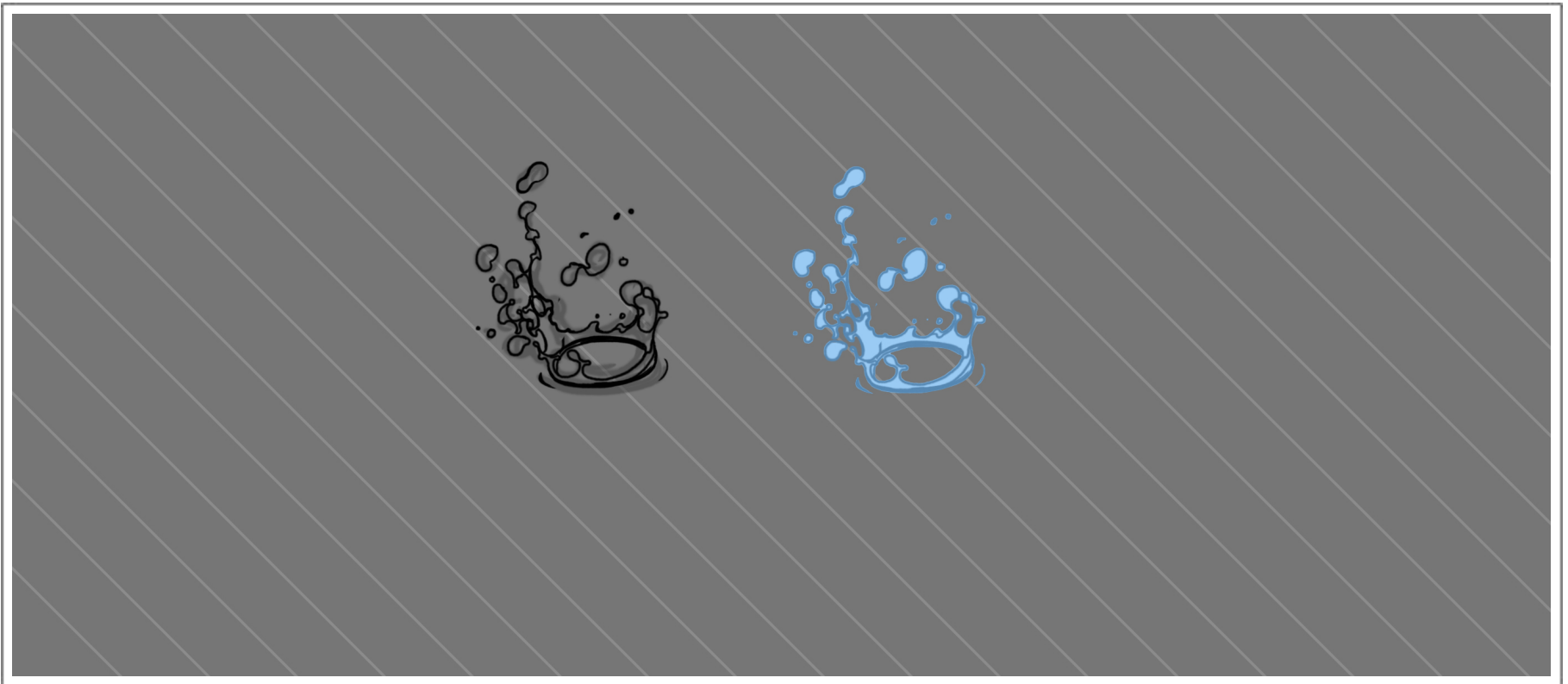
There are some basic rules that when followed in the drawing will make your water look convincing. Water is made from circles, drops that connect with tapering lines. With direction and rhythm in the way they move. I always try to vary the sizes of the drops so they don't become too even and boring to look at. Below I have drawn a rough splash from a rain drop. Notice how the drawings are very rough, and made up with droplets or circles. The circles are moved around from frame to frame to form the motion. They are joined by thin tapering lines. Imagine the water being stretched, the more it's stretched it starts to tear



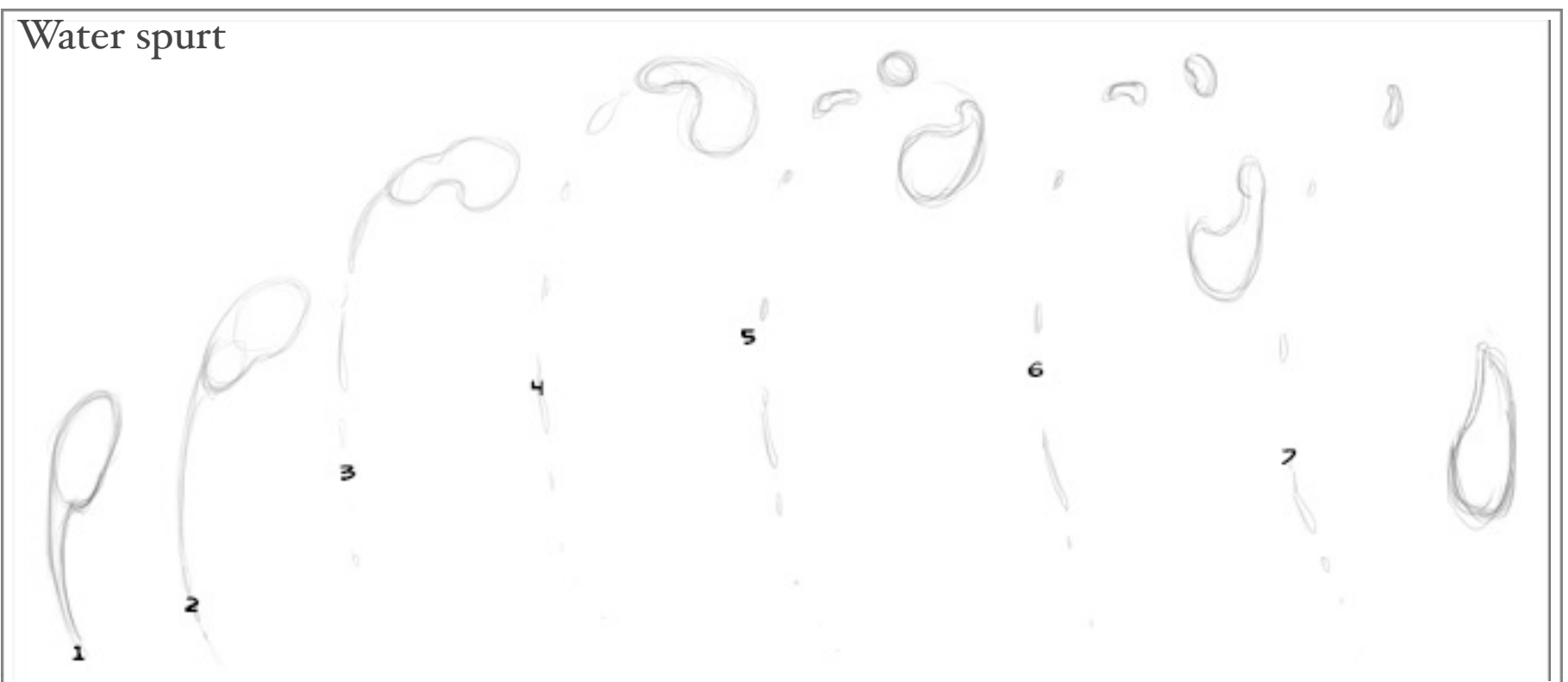
and form holes making more droplets and as the droplets move they become smaller till they dissipate in size and numbers.

Here is a sample of one of these drawings cleaned up. Notice that none of the drops are worm like, they follow the drop shape. Lines are not parallel to each other and there is direction in the motion of the drawing. The drops are heavy on the front and taper to the back. In the sample I have used two colors one for the ink or the line drawing and then the base color. I have attached a link of the roughing out of a water splash here.

<https://www.youtube.com/watch?v=7h2PKfaJ7Co>



Water spurt



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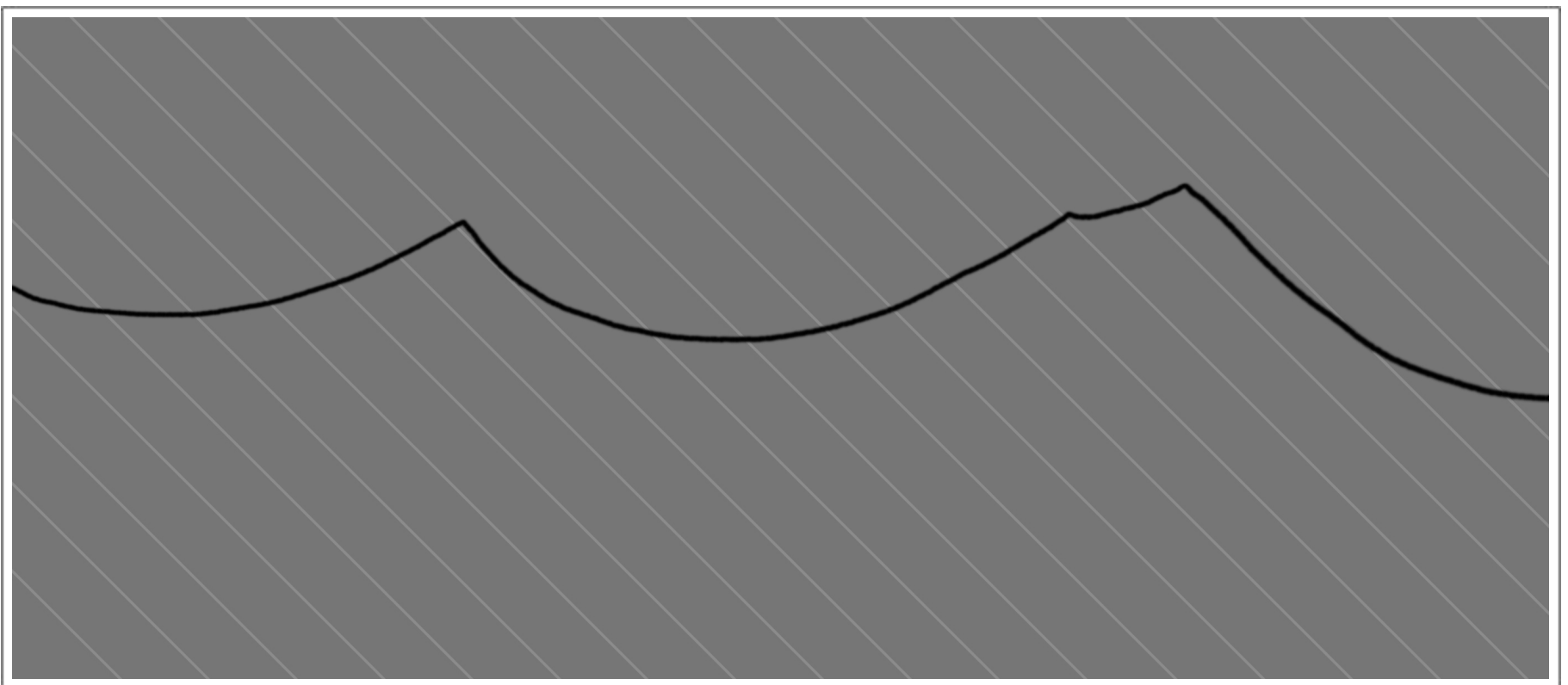
Remember this is only a simple splash from a small impact. You may require some more dynamic ocean wave splashes. Always keep in mind that the lines should never be parallel follow the drops or circles technique no matter how big they will be. The leading drop will always be larger and then taper away, and the drops will break up and become smaller as the motion continues. See image of the water spurt, leading drop is heavy with tapering drops behind.

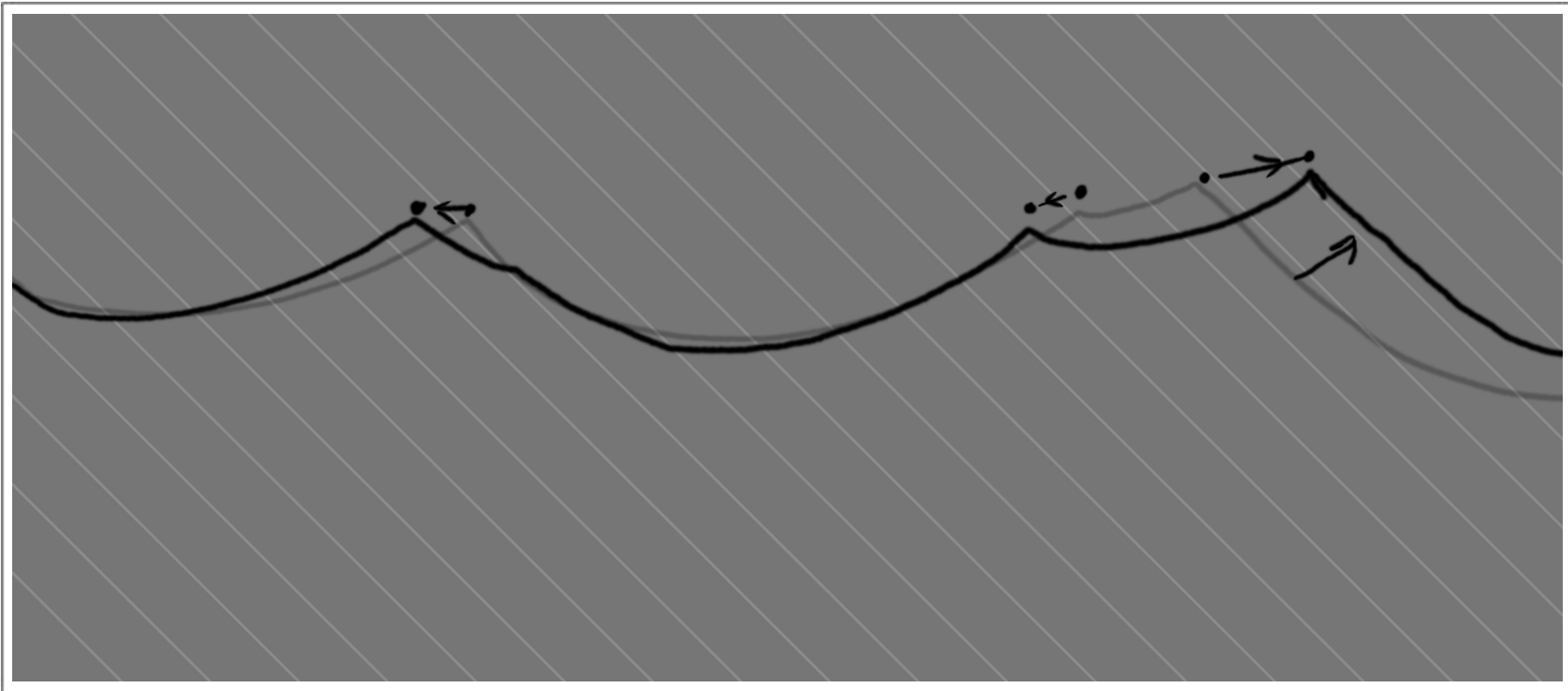
### ***Water surface***

As with drawing anything, start with simple shapes and build slowly. Its not possible to animate every detail all at once. So take your time break it down into small manageable steps. Animate one part and then go back to the start and animate another and so on until you have what you need. This will give you a chance to check your timing as you go.

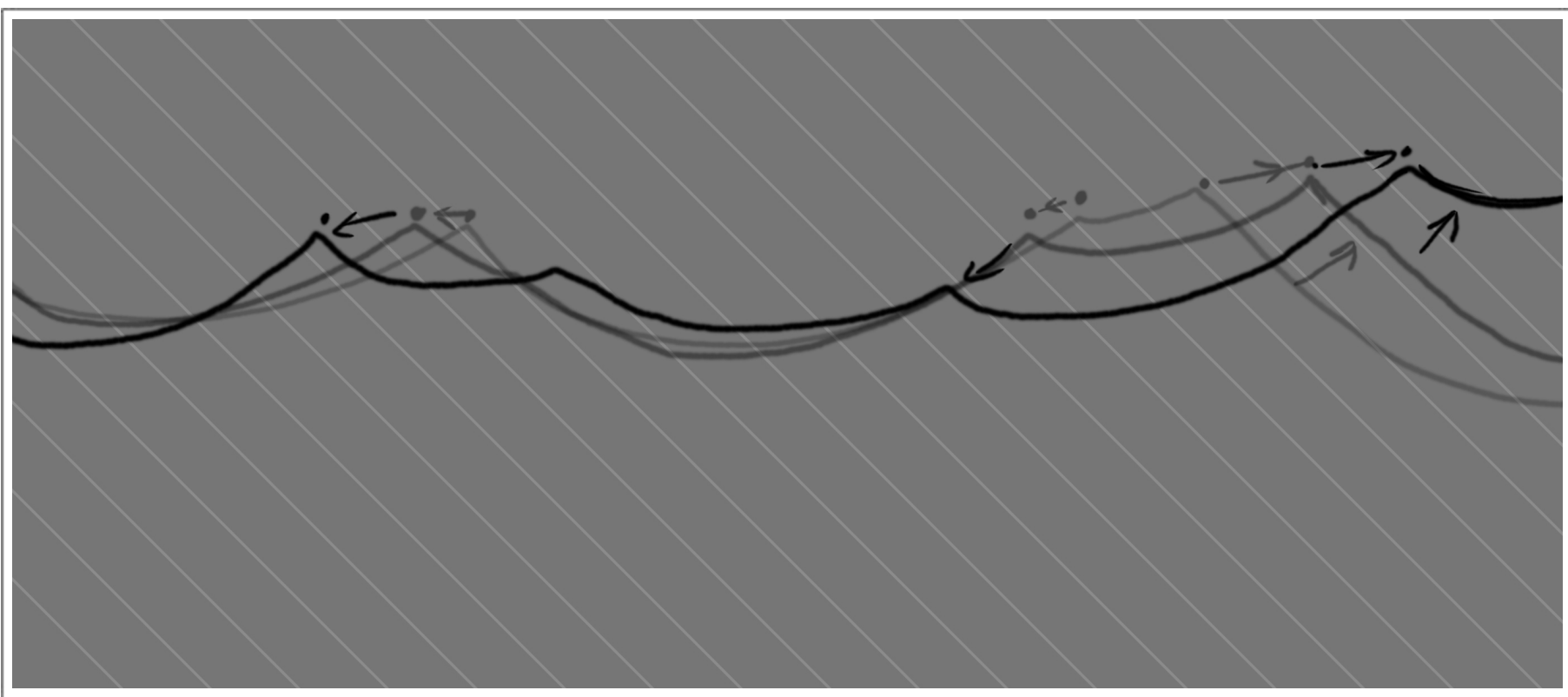
If you want to animate water at the edge of a pool or an ocean surface the technique is the same. However the timing may be different. Large bodies move slower than smaller ones. So a little rain splash will be very fast compared to large rock splashing into a pond.

Lets start with the water line. It will have peaks where the water is being pushed from below and gathers to a point. It's at this point that the water cannot go higher and starts to give way to the forces of gravity pushing down on it. So it finds another way out. See below image, the water line parts. Creating another dip as the line that created the peak starts to fall and create a dip pushing the water line up to another peak. Its easy to see how this process works. There are a few places you can get stuck. Lines can start to become



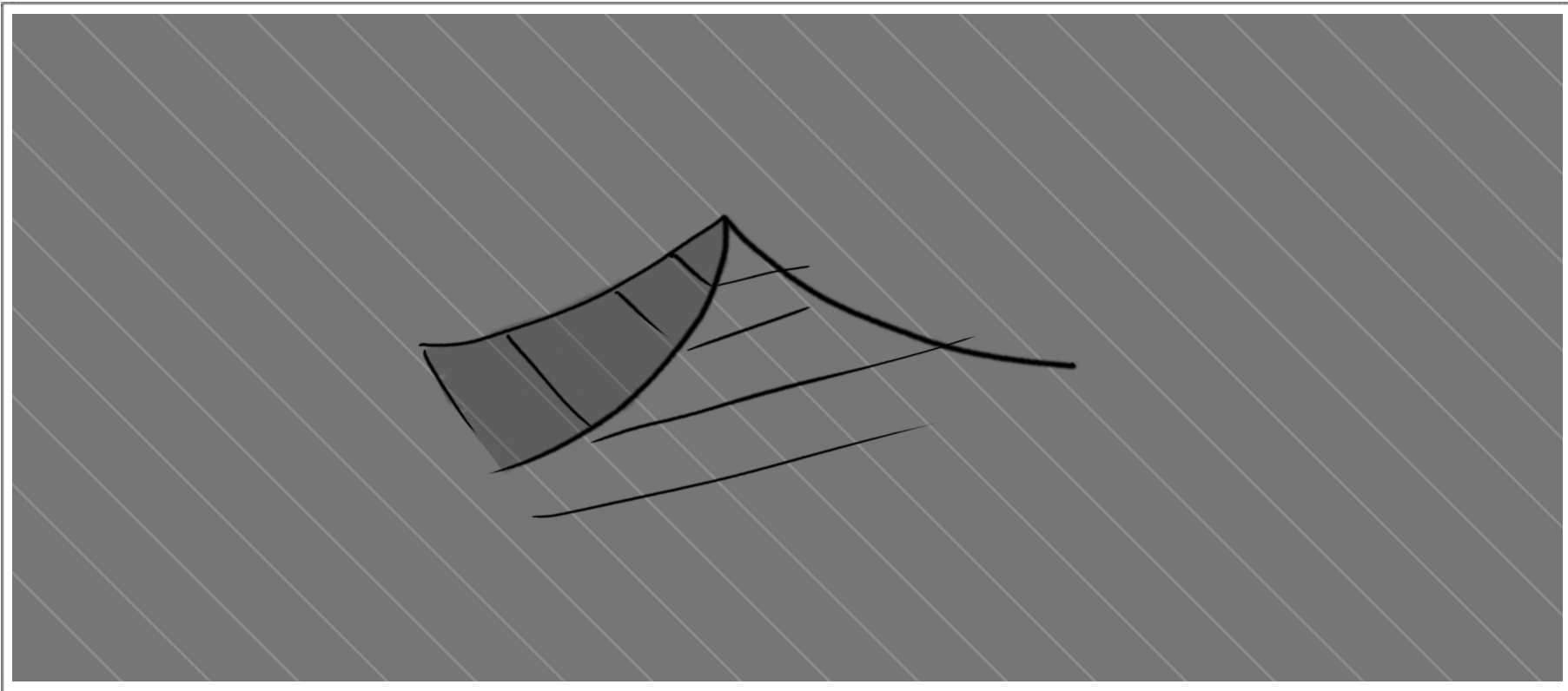


flat. The motion if not directed well can start to look choppy and unconvincing, lacking direction. Its okay for some peaks to go back on themselves and then get caught in the motion of the next peak developing and go with that in a direction you decide.

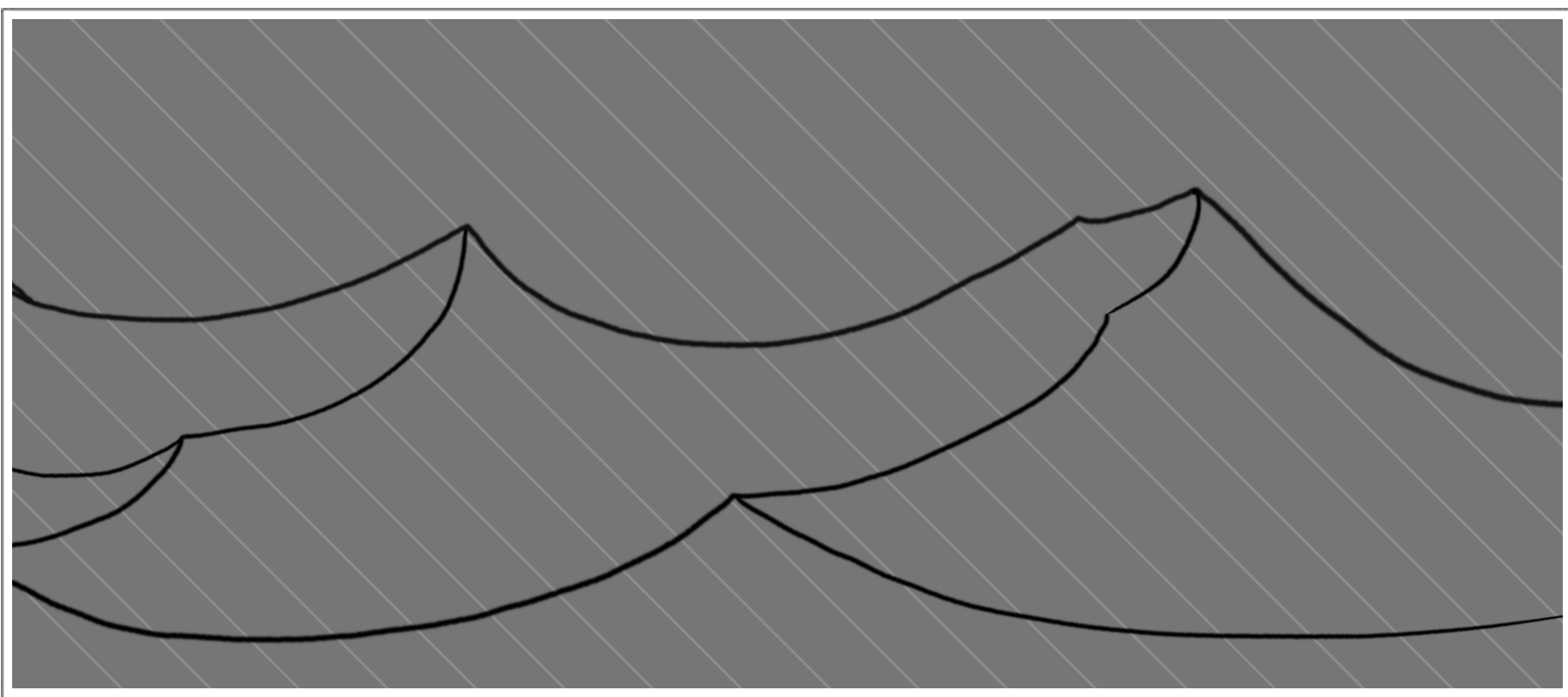


What about the rendering of the surface. Lets add some more lines to give some depth to the water we have. Imagine that each peak is made like a pyramid and the end of each edge line goes to another peak. Remember to keep it simple and slowly progress. This can be as complex or simple as you wish. In the next image I have created a number of peaks from my first drawing, giving it some depth. I have tried to create a good flow in the lines from peak to peak. These lines will move in the same manor as the edge lines we first

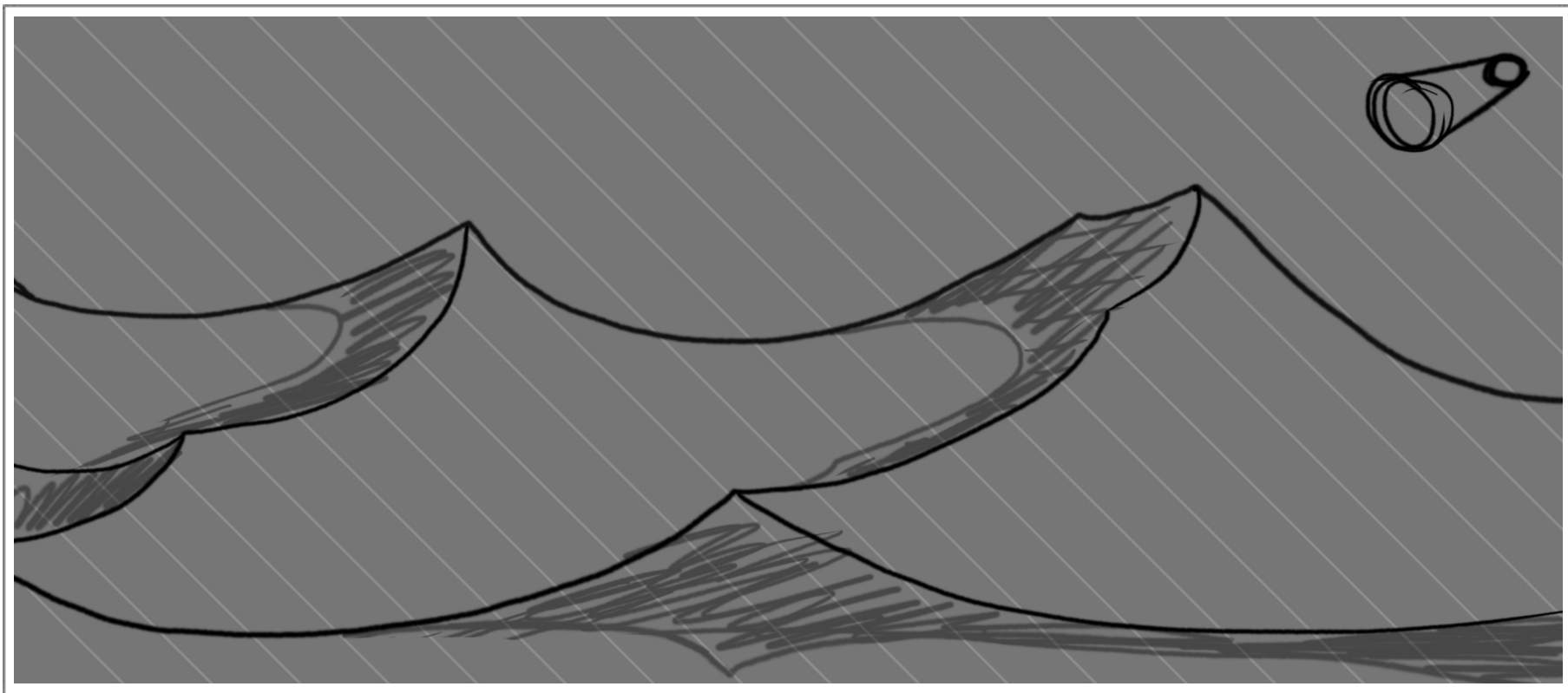




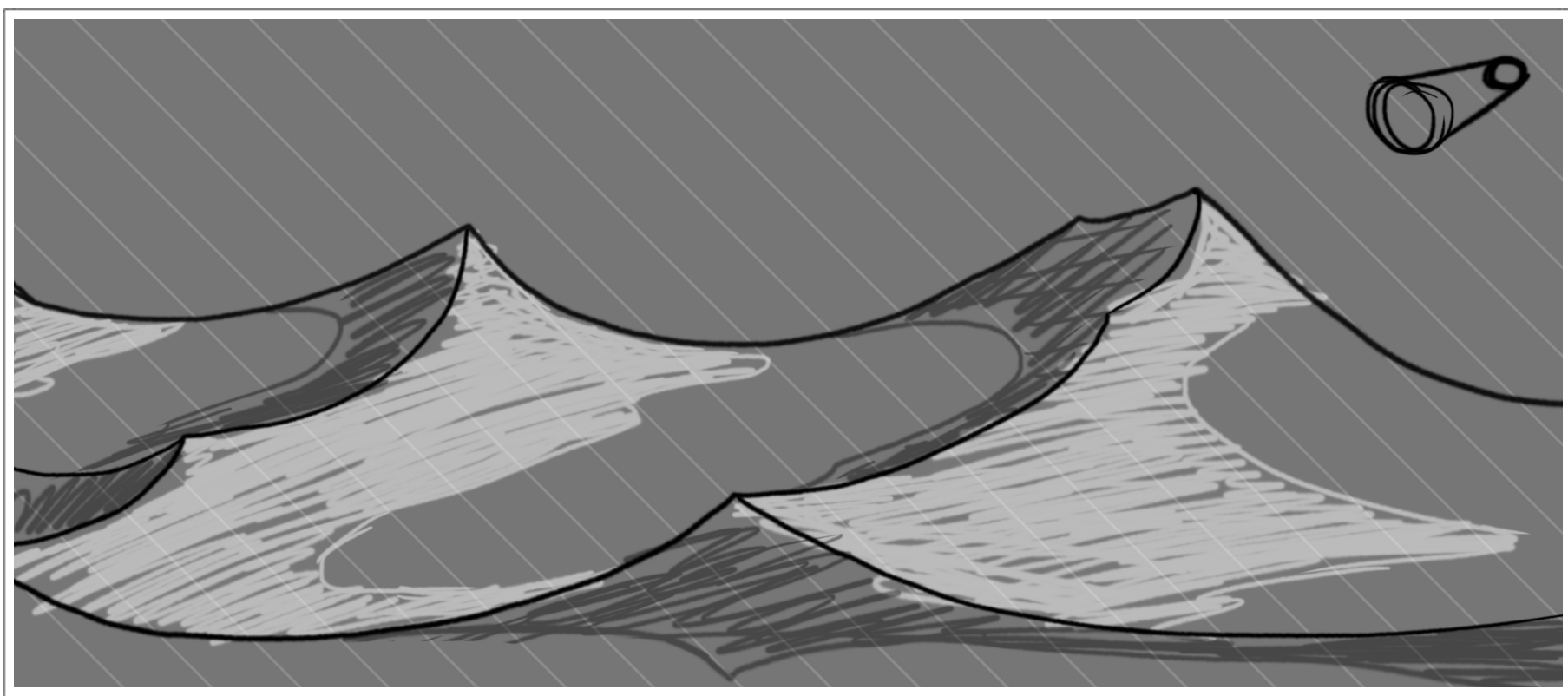
drew. What you will want is a smooth flow of up and downs in the peaks and steer away from repetition or consistencies in the peaks and drops.



The next part is how do we draw what's on the surface of the water. Again let's keep it simple. Water is reflective and so reacts to light and shade. The first thing I need to do is pick a light source. Where is the light coming from, where will it land and where will the shade be on the water. In the next image I have picked a light source and roughly marked in where the shade will be. You can keep it as simple as this or you can add more design by drawing in a highlight. This will be the area that is the hottest, where the light source



hits the water surface. I hope you can see the process, its very much like the red ball we painted in the previous chapter. Many layers can be added to this, mid tones, reflected light, etc.



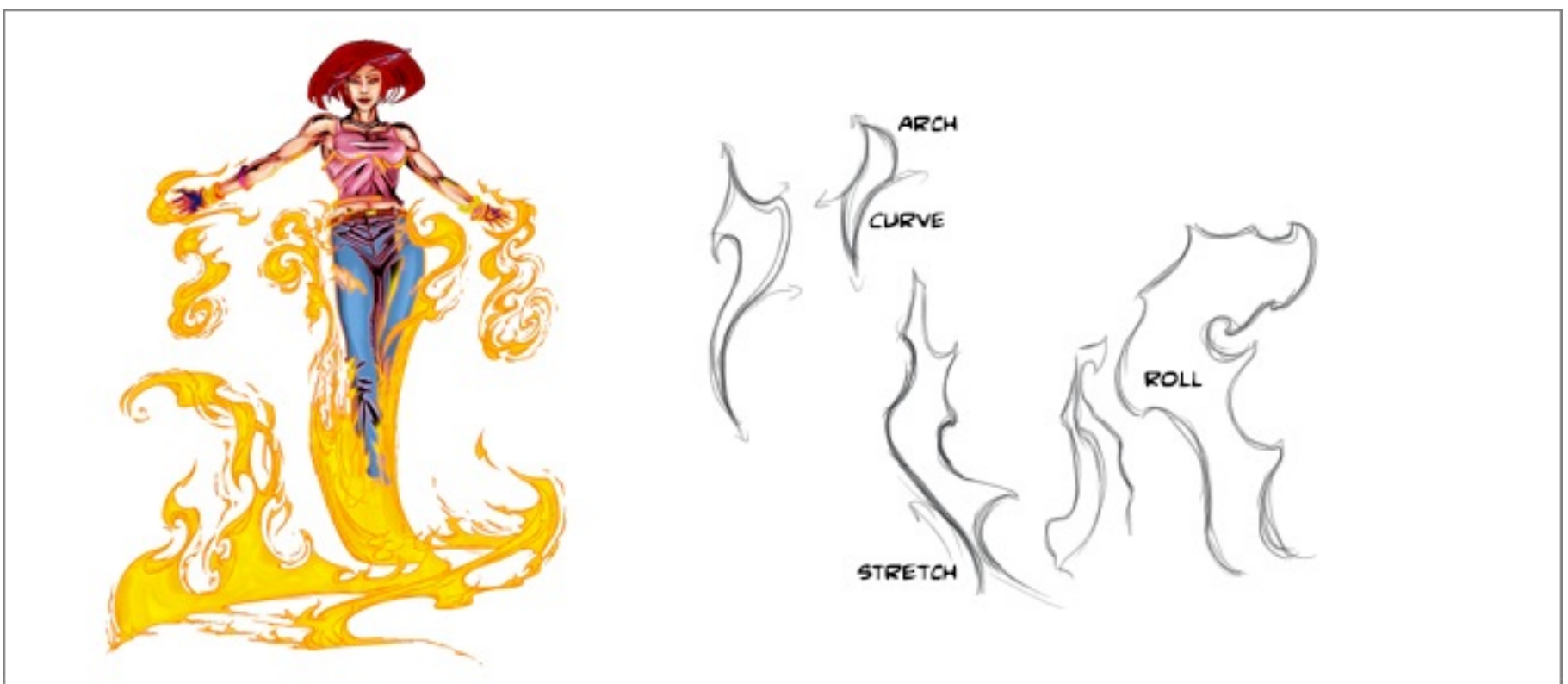
## ***Flame***

What game would be complete without a torch somewhere. Below I have drawn some simple flames in sequence. Flame is always consuming and has a random aspect to its nature. However that does not mean that your animation has no follow through. It is more forgiving to draw. Starting small at the base and bulking out in the middle. This is where your flame shapes will come from, rolling out to form sharp tips licking the air and either flick-

ing away from the main body or vanishing as more flames come up from the body. Try to avoid any departing from the body as the loop in the animation will become apparent. Lines will be curved against sharp, the motion will roll from these curves to the sharps. Try to keep opposite shapes on either side of the flame and avoid the flame getting paral-

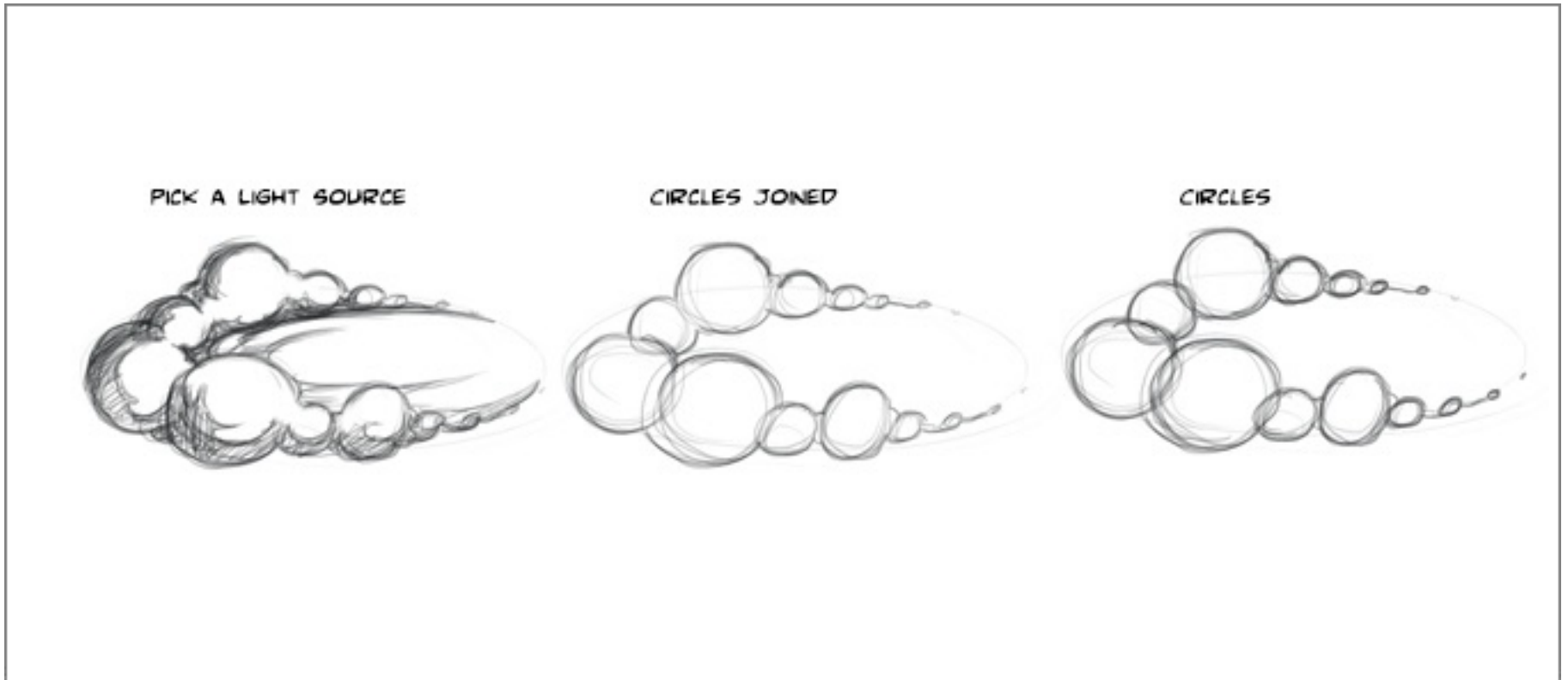


lel. Remember that the forces applied to flame will change how it reacts. A candle flame will be calm and fluid with very subtle motion. Start to add wind or blow it, it will become more violent in nature. Struggling to stay lit. The ends will be more torn or sharp reaching out for oxygen to stay alight. So the forces on the flame will effect how it acts and how it should be drawn.

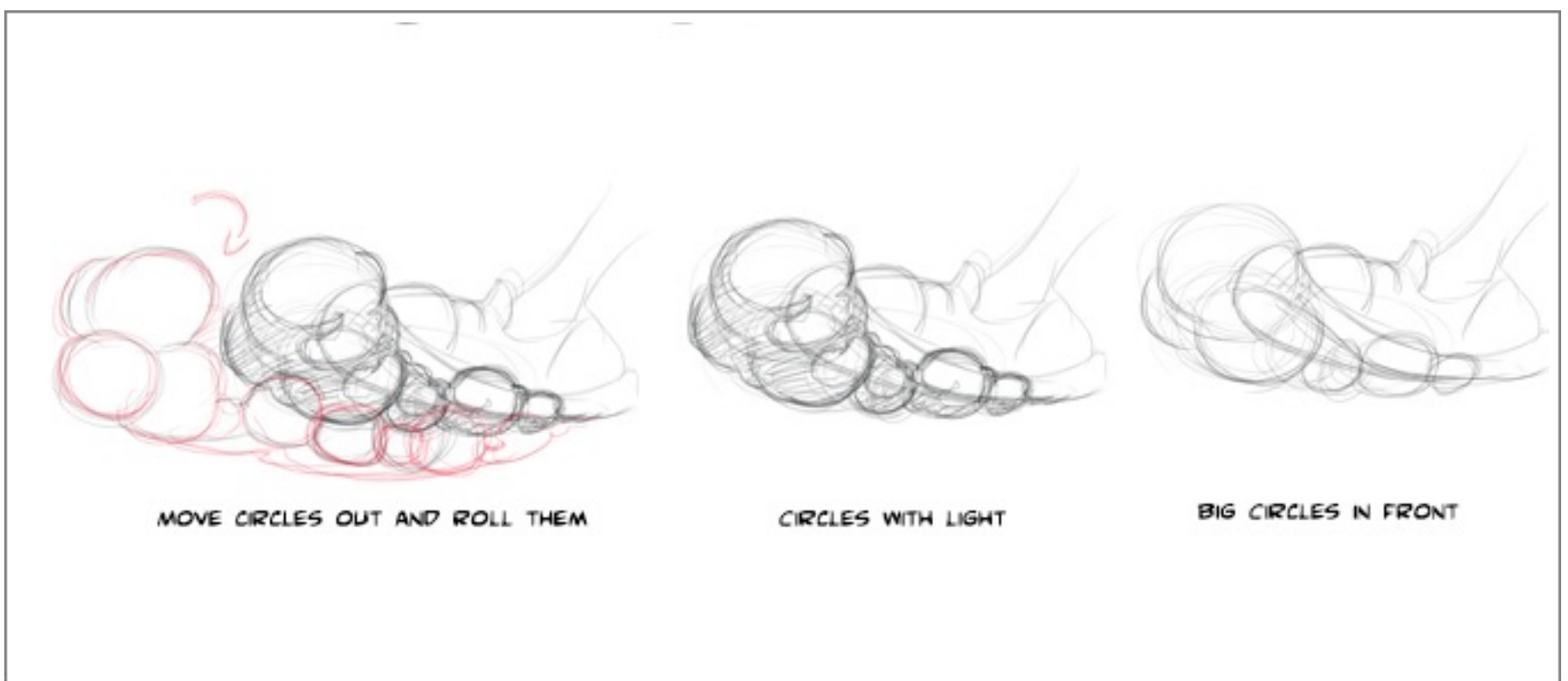


Typically most games use particles to create flames, as most engines have a plugin for this. Unless your game has a realistic look I prefer to hand draw these to match the style of the game.

### ***Smoke or Dust***

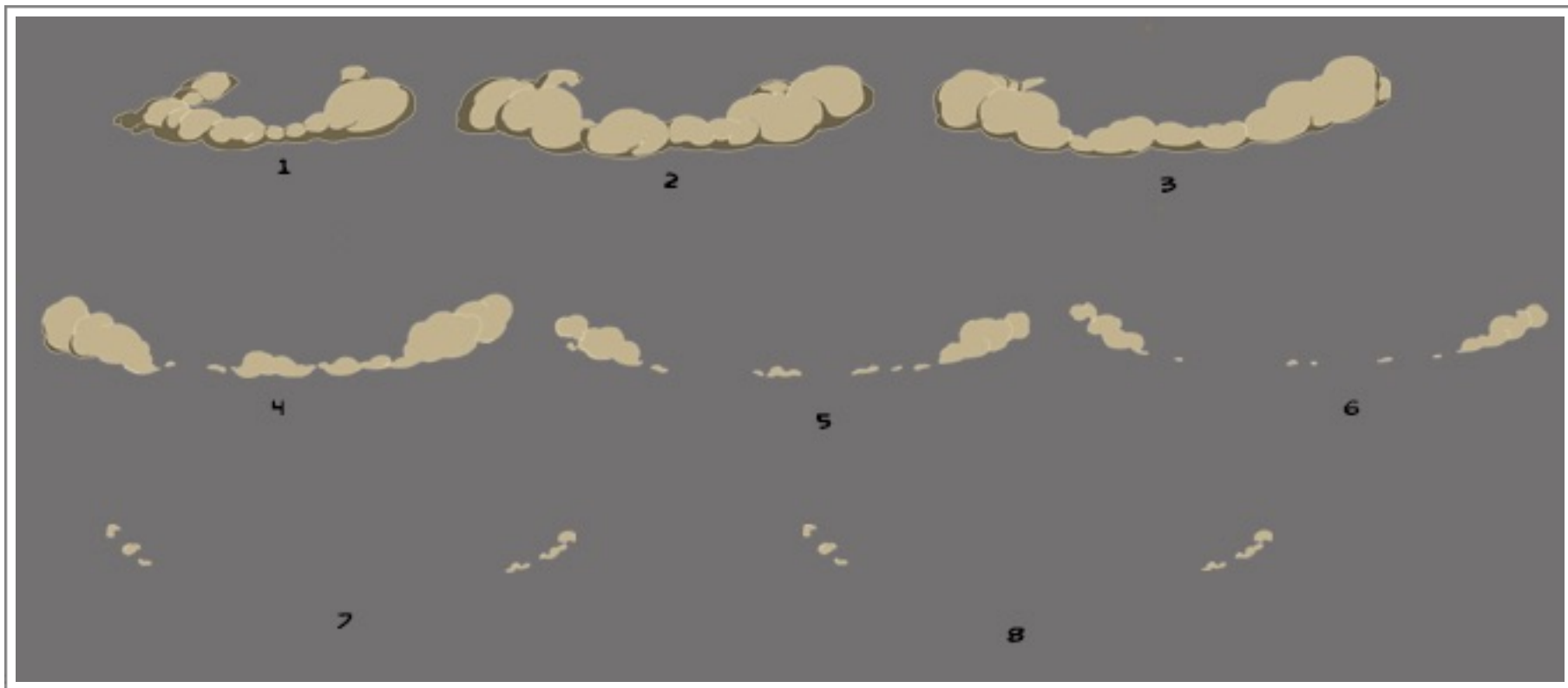


Smoke or dust have the same construction. If you are animating a foot plant or a skid to a stop by a character here is how you could do that. Start to draw circles of various sizes, keeping the sizes different is important. If they start to look the same you will lose the dynamic of the dust and it will become flat and boring. Next join the circles so they look like one. At this point add some more variance to the circles with smaller arcs. Then pick a



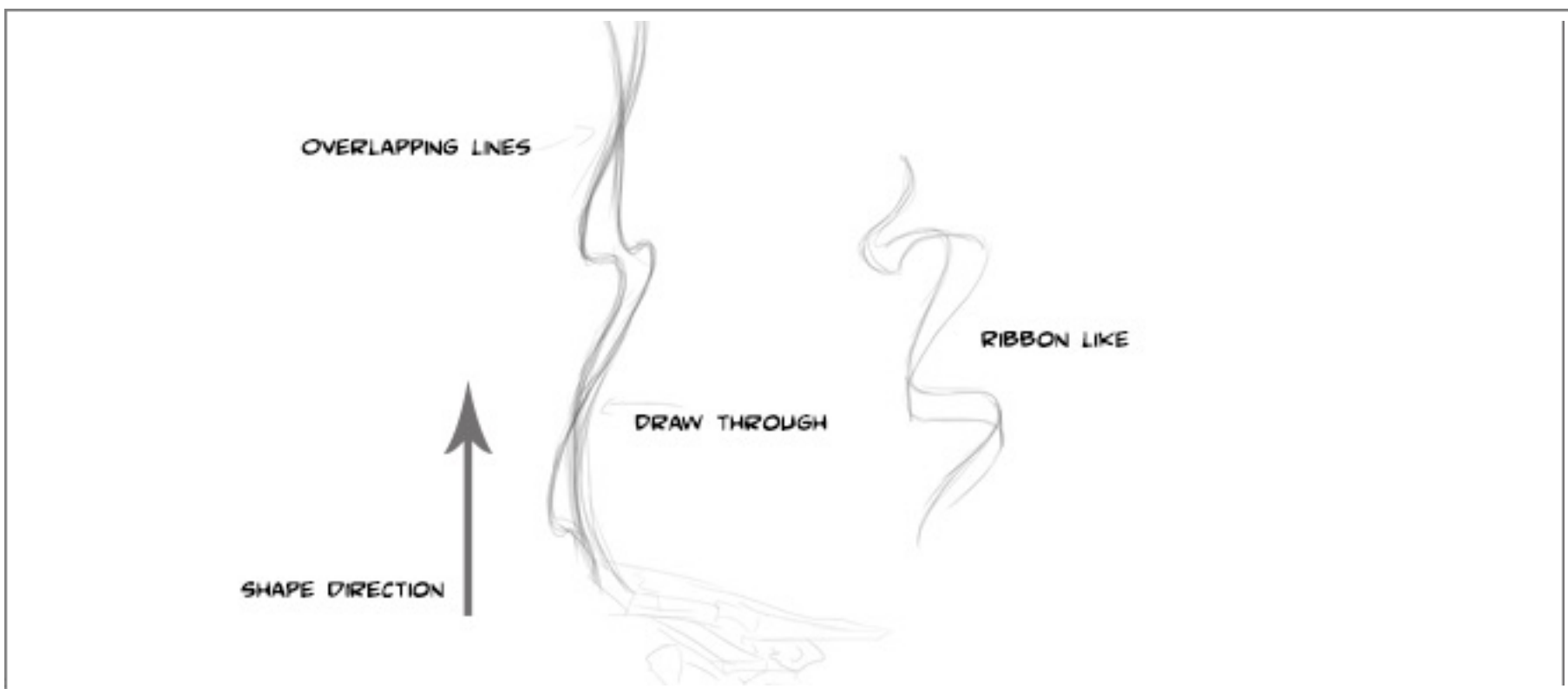


light source and shade. Imagine shading a ball. This is the same except that they are stuck together. So this gets us a basics of how to draw dust. As with all effects the direction and forces being applied make the effect exciting and add dynamics to its look. So in the case of the foot skid start the circles big at the front and get smaller as they go back. The front



circles will move out faster and roll as they move. The smaller ones will move out and become bigger. Dust like this will become more transparent as it animates out. If you want to animate it off, just break it up into smaller parts as it loses motion. See the next image in color and watch as it becomes smaller and breaks up to nothing.

Smoke from a smoldering cigarette or long trailing smoke from a fire can be a good effect



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to have. Maybe after a battle the embers are smoldering, this can add some atmosphere to an environment. The lines to create this are very long and stretched with curves as the smoke rolls upwards. When drawing this effect think of a very fluid ribbon and draw the lines through the smoke. Any shapes that form travel upward and mutate as they move. These would be caused by wind disturbances in the environment. Typically this effect would dissipate as it travelled up.

The shape will merge into itself and create larger volumes in places. Stretching out and becoming thin in other places as the smoke source creates plumes.



## ***Pixie Dust***

This is an effect that I love to see in games and movies. Giving environments a magical feel with glowing animated lights. Its a very easy effect to animate and can be done by particles or hand drawn. I would hand draw this effect if you need to have control over the motion, like animating on a logo, taking the shape of a character, etc. First, let me give some settings I use in photoshop to get the glow. These can be changed to suit your environment or purpose, but will give you a start.

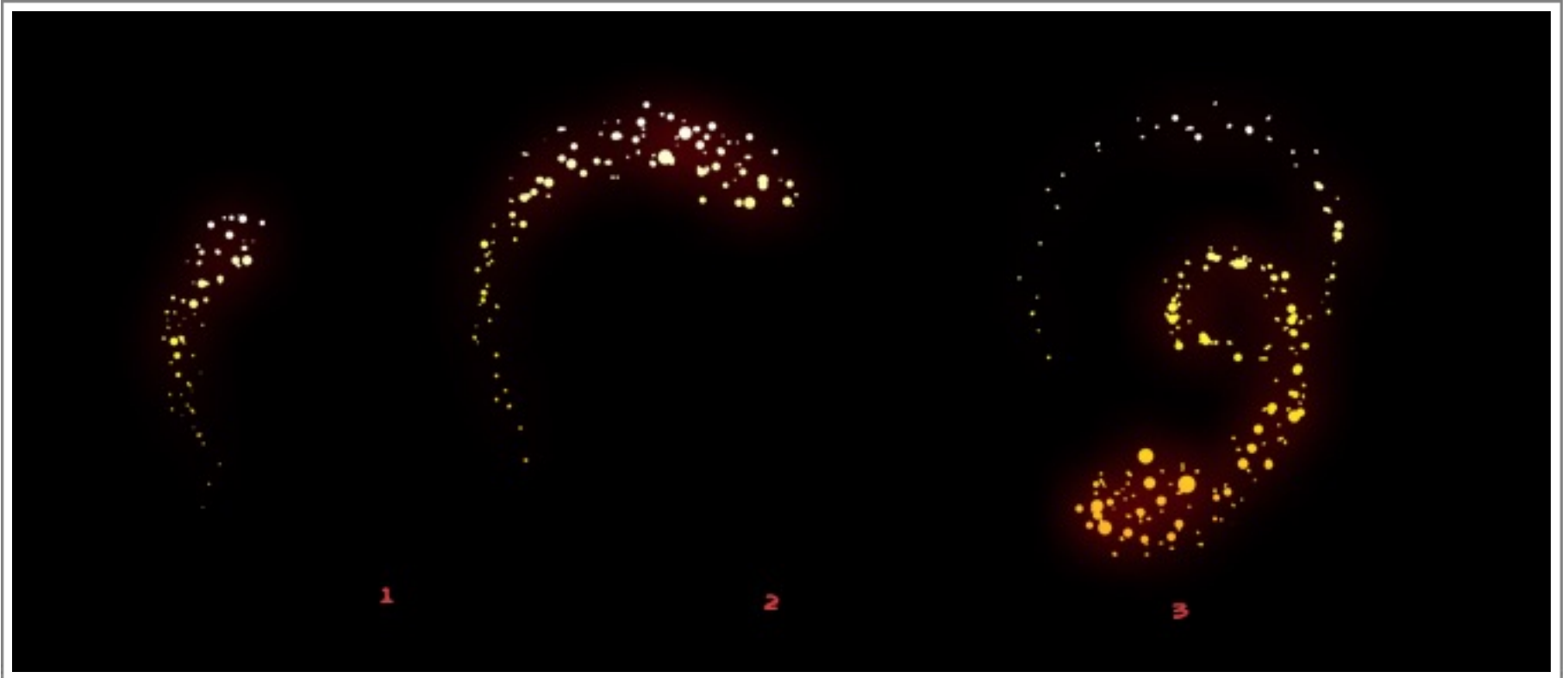
Double click on the layer and bring up Layer Styles.

Set an Inner glow to a color you like, I used orange.

Set a gradient, I used Orange to yellow to white.

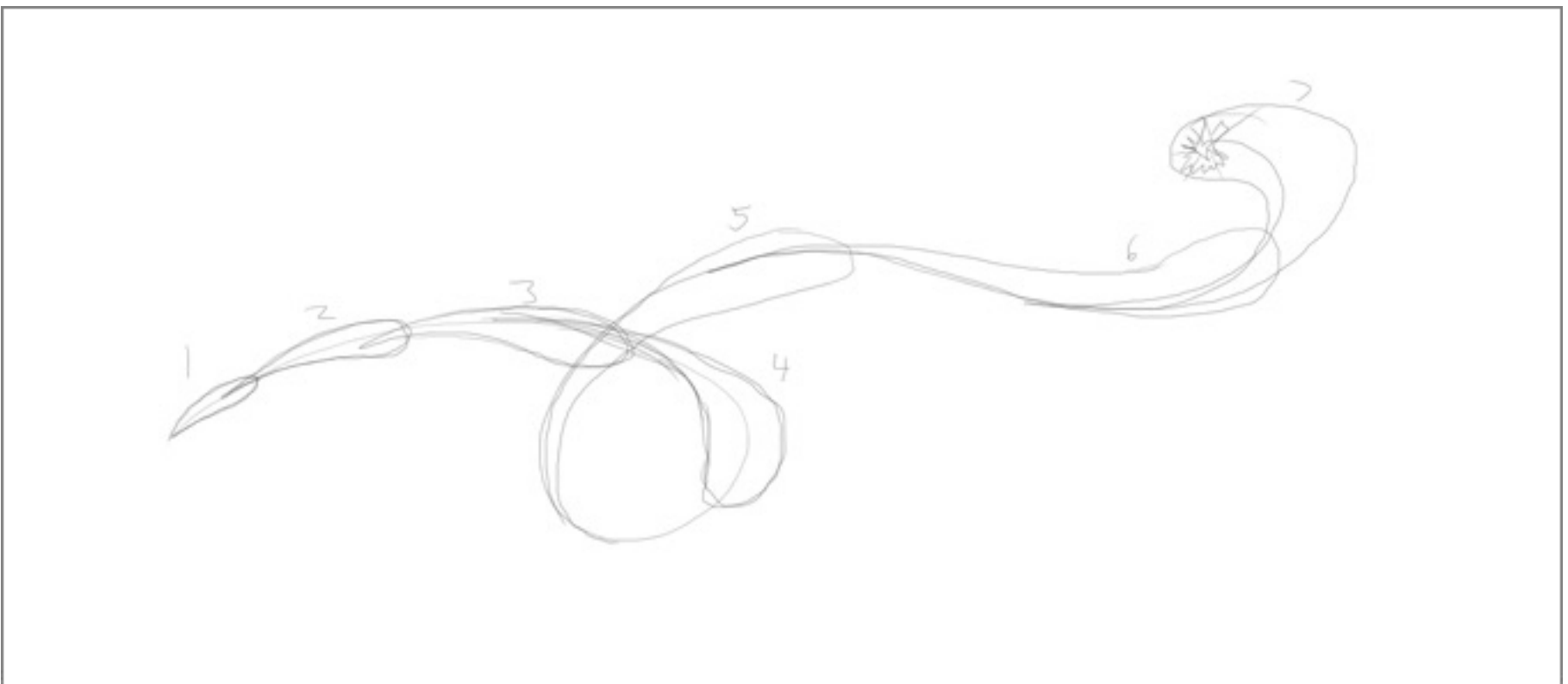
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And then set an outer glow, I used a bright red. I recommend you play with the numbers



to get the look you need. Then save the style so it can be applied to all of your layers, or when you need it again.

Very few to none of the dots will follow through. What we want to achieve is the motion of the volume of the pixie dust. Where we might get some follow through is if some were to fall away slowly. However for games that would be rare. I usually start by drawing out a line or path of where I want the motion to go. Then rough in the volume of the dust on



the line. It looks crude and not very nice to look at but its just a guide. Then start with a

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small brush and fill in the dots. Keeping the spacing random, increase the size of the brush and put in more dots. As you increase the size of the brush keep the larger dots to the leading head of the dust. What we want is a nice trail of large to small.

### Quick tip on Creating a loop

To Create a looped animation of a flame or water, etc. Make your first drawing, then imagine what it would look like a few frames ahead and draw that shape, try to keep some reference from drawing to drawing as you will have to in-between these key drawings. When you have the length of your animation almost complete, copy your first drawing and use it as your last. So for instance you will have drawing 1,3,5,7,1 draw a frame between each frame making it 1,2,3,4,5,6,7,8,1 play your animation and see if the timing is right, adjust as you need to. Your animation will pop at the loop, but don't worry about that now, you just want your timing to be right. When you have a good flow to your animation delete your last frame which is frame 1, so your frames will go 1,2,3,4,5,6,7,8, now your animation will loop nicely, because 7 and 8 are forming frame 1 which you are going back to. Just remember flames rise, so when you are animating back to 1 keep your flame rising or it will go backwards or down to 1, which is not what you want.